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CHALLENGING THE SUPERIOR STUDENT BY MAKING THE STUDY OF RUSSIAN AVAILABLE IN THE ELEMENTARY SCHOOL CURRICULUM VIA TELEVISION.

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OVER A 3-YEAR PERIOD, THIS STUDY INVESTIGATED MANY FACETS OF THE ACHIEVEMENT, BEHAVIOR, AND INTERESTS OF GROUPS OF STUDENTS WHO BEGAN THE EXTRACURRICULAR STUDY OF THE RUSSIAN LANGUAGE IN THE FOURTH AND FIFTH GRADES. IN ADDITION, SEVERAL CONTROL GROUPS WERE STUDIED TO ALLOW COMPARISONS OF THE EFFECTS OF THIS LANGUAGE PROGRAN. IT WAS CONCLUDED THAT, REGARDLESS OF IQ OR WHETHER THE LANGUAGE WAS TAUGHT VIA TV OR WITH A LIVE INSTRUCTOR, THE STUDENTS TAKING RUSSIAN APPEARED TO HAVE PROFITED FROM THE EXPERIENCE. NOT ONLY DID THEY GAIN CONSIDERABLE KNOWLEDGE OF RUSSIAN BUT THEY ALSO APPEARED TO HAVE IMPROVED IN THEIR REGULAR CLASSROOM WORK AND BEHAVIOR AS A RESULT OF THE EXPERIENCE. REGULAR CLASSROOM WORK OF THE "AVERAGE" STUDENTS TAKING RUSSIAN WAS PERFORMED AS WELL AS, OR BETTER THAN, THE CONTROL GROUP OF "SUPERIOR" STUDENTS WHO WERE NOT TAKING THE LANGUAGE. OTHER RESULTS ARE REPORTED IN TERMS OF SEVEN HYPOTHESES TESTED. (JC)

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129

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SALT LAKE CITY, UTAH, 1963

Challenging the Superior Student by Making the Study of Russian Available in the Elementary School Curriculum via Television

By OAKLEY J. GORDON, KEITH M. ENGAR, DONALD R. SHUPE

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Final Report of a Research Project
Supported by a Grant from the
U.S. Department of Health, Education and Welfare
Office of Education

The University of Utah, A. Ray Olpin, President

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TABLE OF CONTENTS

page

PROJECT PERSONNEL 2

PURPOSE OF THE PROJECT 5

ABSTRACT 5

RESEARCH DESIGN 6

THE MEASURING INSTRUMENTS 9

BASIC CHARACTERISTICS OF THE SAMPLE 11

RESULTS 12

- Hypothesis I 12
- Hypothesis II 27
- Hypothesis III 35
- Hypothesis IV 43
- Hypothesis V 47
- Hypothesis VI 49
- Additional Results 53

SUMMARY AND CONCLUSIONS 58

APPENDICES 61

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Special mention should be made of the contributions given by Superintendent M. Lynn Bennion, Salt Lake City Schools, and Dr. Marion G. Merkeley, late State Superintendent of Public Instruction and formerly Assistant Superintendent of the Salt Lake City Schools. Dr. Bennion and Dr. Merkeley made significant suggestions in the initial structuring of the project.

PURPOSE OF THE PROJECT

The purpose of this project was to attempt to challenge superior students in elementary school by teaching them Russian primarily through the medium of television. To see if these superior students were in fact challenged, two different levels of pupil response were observed. At the level of intervening variables, measures of student interest were made. At the level of resultant behavior, measurements were made of the students' performance in their regular classroom. To see if the students had in fact learned Russian, measurements of their achievement in that language were also made.

For control purposes these measurements were also collected (where appropriate) on certain other groups, viz., some average students who were included in the TV Russian classes, some superior students who took the Russian course from "live" instructors, and some students who were not taught Russian.

ABSTRACT

Over a three-year period this study investigated many facets of the achievement, behavior, and interest of groups of students who began the extracurricular study of the Russian language in the fourth and fifth grades. In addition, several control groups were studied to allow comparisons of the effects of this language program. Because the choice of students who made up the control groups was largely out of the hands of the project staff (except for control on IQ) the groups were not always well matched on other important variables (motivation, for instance). In some cases this fact restricts the generality of the conclusions; nevertheless, through careful statistical control, we were able to eliminate these initial differences to a large degree.

We can therefore conclude from this study that, regardless of the intellectual ability of the students or whether the language was taught via TV or with the instructor present in the classroom, these students taking Russian appear to have profited from the experience. Not only did they gain considerable knowledge of Russian but they appear to have improved in their regular classroom work and behavior as a result of the experience.

Although the average students taking Russian did not achieve at the level of the superior students taking Russian, their regular classroom work was much better than the average control group who were not in the Russian class. It was even found that in their regular classroom work these average Russian students did as well as, or better than, the control group of superior intelligence who did not take Russian. Although this average group may have been unusual (perhaps highly motivated) it is still surprising that they did work at

as high a level in their regular classrooms as students who were about 15 points higher in intelligence. We conclude that, in fact, the taking of Russian challenged the average students, perhaps even more than the superior students.

Although most of the students in this study were taught Russian by television followed by a teacher-monitored study session, a group of students were instructed by a Russian teacher actually present in the classroom. This "live" instruction was paced with the TV instruction but the exposure to the Russian teacher for the "live" group was for the whole class-period while for the TV group it was only for the duration of the actual TV broadcast. It is not surprising, therefore, that the students with "live" instruction tended to learn more Russian than did the students taking the language over TV. Yet some of the TV classrooms did as well as the "live" group in the Russian tests. Variation in performance seemed to be partly a function of the teacher who monitored the class during televised instruction and guided the students in their studying. Those teachers who were interested (some even learned Russian along with the students) and creative had classes which usually developed more facility with the language than those teachers who served only as controlling agents within the classroom.

RESEARCH DESIGN

The physical setting for this project was the Salt Lake City School District. In the initial planning with the district superintendent and his staff, fifteen elementary schools were chosen to receive the Russian instruction. Thirteen of these schools were then equipped with a television set for viewing the course. The remaining two schools received the Russian course from actual instructors in the classroom. The class was given at the end of the school day after the students had been dismissed from their regular classwork. Thus, three times a week the students chosen for the project assembled together in a classroom to receive the Russian course. In those schools receiving the class via television, a regular member of the school's teaching staff was hired to supervise or monitor the students while they received the televised instruction. The students in these schools received their television lesson for the first portion of the hour. For the first two years this consisted of a thirty-minute program; however this was reduced to twenty minutes in the third year. For the remainder of the hour the students worked at their individual desks on assignments given by the television instructor. The monitoring teacher supervised the class as he or she saw best.

The televised instruction was conducted by a native Russian. He also conducted one of the two classes of the regular Russian instruction while another

native Russian conducted the class in the other school. These two "live" classrooms used the same lesson material and proceeded on the same scheduled pace as the TV classrooms. The after-school hour of instruction was conducted by each of these instructors as he or she saw best. Obviously this was not always a pattern of one-half hour of instruction followed by one-half hour of individual student practice such as was done in the TV classroom.

To be eligible as a "superior" student for this project the student had to have an IQ of 115 or higher as measured by the school-administered Pintner-Durost General Ability Test. Both of the schools where "live" instruction occurred were able to provide a full class of superior students (approximately thirty). The TV schools had a little more difficulty. It was simply not possible to compile a list of all superior students in each school and then randomly designate which ones would take the Russian course. Since the class was to run for three consecutive years, we wanted to begin with fourth-grade students. Some of the TV schools did not have enough superior students in the fourth grade who were willing to participate in the course. Therefore, in some schools this was handled by also enrolling fifth-grade students who promised to remain within the program for three years even if it meant returning to this classroom during the seventh grade (typically held in a junior high school). In a few instances students were transported from the fourth grades of neighboring elementary schools to fill the class. By these procedures four of the TV classes were completely filled with superior students. Nine TV classes were predominantly filled with superior students, with average students making up the balance. The remaining two television classrooms were composed of a mixture of average students and superior students. Although the major concern of this project was with superior students, it was felt desirable to include average students in the televised classes for comparative purposes.

For purposes of control, classroom records were kept on other students who were not enrolled in the Russian course. These students were chosen in part from the above fifteen schools and in part from other elementary schools in the district. Again it would have been more desirable to have chosen the students for the Russian class and for the control group on a purely random basis from the same schools. We have already noted one reason why this was not possible. In addition to the shortage of superior fourth-grade students in some schools, there were the additional human problems involved in an ongoing action research program. It was not possible to convince every student and his parents that he should take part in such a program. It also was not possible to convince every student and his parents that the child should *not* take part in such a program. Compromises with objective randomization had to be

made. Therefore, whenever possible statistical controls were imposed on comparisons made in the results of this study. These controls will be pointed out at the appropriate time in succeeding sections of this report.

The above selection procedure yielded a total of 600 students. They were distributed across eight categories or groups according to the needs of the research design. This distribution is shown in the following table:

TABLE 1

The Distribution of Students by Experimental Groups

Student group	*Code name*	*Total number*	*Withdrew*	*Per cent attrition*
Enrolled in Russian				
Superior students beginning in the fourth grade, via TV	4S-TV	193	63	33
Superior students beginning in the fifth grade, via TV	5S-TV	84	24	29
Average students beginning in the fourth grade, via TV	4A-TV	46	15	33
Average students beginning in the fifth grade, via TV	5A-TV	18	10	56
Superior students with "Live" instruction	Live	54	17	31
Control, not in Russian				
Superior students beginning in the fourth grade	4S	51	7	14
Superior students beginning in the fifth grade	5S	121	17	14
Average students from the fourth and fifth grades	4/5A	33	2	6
Total		600		

The code names will often be used in the remainder of this report to identify the groups instead of using the more lengthy verbal description. That students "withdrew" from the project is a natural phenomenon in a longitudinal study covering three years. Withdrawing, of course, has a different meaning for the sample enrolled in Russian than for the Control groups. In the latter sample it is simply a matter of the students' families moving out of the neighborhoods that were included in this project.

THE MEASURING INSTRUMENTS

I. Measurements taken on all project students.

A. Measures of student aptitude.

1. *Intelligence.* As part of the Salt Lake City school program every student had already been given the Pintner-Durost General Ability Test. On the basis of these scores the superior (IQ above 115) students and the average students were chosen for this project.

2. *General Achievement.* The Metropolitan Achievement Test had also been routinely administered to the fourth-grade students in Salt Lake City at the beginning of the academic year. From this test the following seven scores were extracted:
   (a) Word knowledge
   (b) Word discrimination
   (c) Reading
   (d) Spelling
   (e) Language
   (f) Arithmetic computation
   (g) Arithmetic problem solving

B. Measures in regular classroom, collected over three years.

1. *Achievement in Regular Coursework.* This is equivalent to the information typically recorded on report cards except that for research purposes this achievement had to be recorded in objective-score form instead of the more usual qualitative assessment. A committee of homeroom teachers agreed upon the use of a percentage score based upon the student's absolute achievement and not upon his achievement in terms of his ability. Twice during each school year, once in the middle of the year, and again at the end of the year, the homeroom teachers assigned these percentage scores to each student involved. The scores were assigned in each of the following four areas of achievement (see Appendix A1):
   (a) Science
   (b) Social Studies
   (c) Arithmetic
   (d) Spelling

2. *Socio-emotional Behavior.* Twice during each year the homeroom teachers filled out a behavior check list for each of the students involved. By statistical analysis it was determined that there were three relatively independent scores to be calculated from this check list. These scores are as follows (see Appendix A2):
   (a) Self-Initiated Drive
   (b) Leadership
   (c) Emotional Control

II. Measurements taken only on students enrolled in Russian.

A. Measures of achievement in Russian.

1. *Paper-and-Pencil Tests.* These tests were constructed by the Russian instructors and were administered intermittently throughout each year. Although the areas of achievement that were tested differed somewhat from year to year, they included the following (see Appendix A3):
   (a) Translation
   (b) Dictation

(c) Objective
(d) Completion
(e) Grammar
(f) Comprehension

2. *Tape Recordings.* At the end of each of the first two years each pupil orally spoke and translated Russian into a tape recorder. These performances were scored for (see Appendix A4):
   (a) Reading
   (b) Pronunciation
   (c) Comprehension

B. Measures of student interest in the Russian class.

1. *Pupil Self-Report.* Twice during each school year, once in the middle of the year, and again at the end of the year, the students checked answers on a simple one-page questionnaire. Four scores were obtained from each administration of the questionnaire (see Appendix A5):
   (a) How well the student liked the Russian class (as indicated on a five-choice scale).
   (b) Whether he would like the class to be shorter or longer each day.
   (c) Whether he would like the Russian teacher to go faster or slower.
   (d) Whether there was something else he would rather do after school.
2. *Parent Questionnaire.* Once during the middle of each year the parents of the pupils were asked to fill out a questionnaire concerning their child. From this questionnaire two items were obtained (see Appendix A6):
   (a) Parent Rating. The parents' rating of their child's interest in the Russian class (as indicated by a Thurstone scaling of statements).
   (b) Problem Check List. A list of any problems encountered in the home situation because of the child's attendance in the Russian class after the close of the regular school day.
3. *Film Ratings.* Periodically during the first year, movies were taken of the children in five of the classrooms while they received their one-half hour of Russian instruction. In each of these schools the movies were taken during nine different class periods: for three consecutive class periods during the fall, three consecutive class periods during the winter, and three during the spring. As they viewed these films, trained judges made the following rating of the pupils' interest on a four-point scale: definitely interested and paying attention, probably interested, probably not interested, and definitely not interested or not paying attention. These judgmental ratings were made at three different times during a single day's film — once at the beginning of the film, next in the middle of the film (i.e., after a lapse of fifteen minutes), and finally at the end of the film.

C. Measures of socio-economic level.

1. *Parents' Education.* The number of years of schooling completed by each parent, as reported by the parents on a questionnaire.
2. *Father's Occupation.* The father wrote the title of his occupation on a questionnaire. These responses were then categorized as follows:
   (a) Professional
   (b) Semiprofessional
   (c) Managerial

(d) Clerical
(e) Sales
(f) Agricultural and self-employed
(g) Service
(h) Skilled Labor
(i) Semiskilled and Unskilled

BASIC CHARACTERISTICS OF THE SAMPLE

Using the two measures of student aptitude described above, intelligence and general achievement, the various groups in this project can be described quantitatively as follows:

TABLE 2
Aptitude Scores of the Experimental Groups

Group code name	*IQ*	*Total achievement*
4S-TV	121.6	5.6
5S-TV	121.3	--
4A-TV	107.1	4.7
5A-TV	104.4	--
Live	121.9	5.7
4S	120.3	5.3
5S	121.0	--
4/5A	99.8	3.9

The superior students had a mean IQ above 120 while the average students had a mean IQ in the vicinity of the expected 100. Further, the S-TV groups were not significantly different from the S groups. However, the A-TV students had a significantly higher mean IQ than the A students. Apparently the average students allowed to enroll in the Russian class were a more select group than those used for control purposes.

The total-achievement score obtained from the Metropolitan Achievement Test is reported in terms of grade level. Thus the 4S-TV group were at a mean grade level of 5.6 years while the 4S were at 5.3 years. Both of these groups were obviously "superior" in terms of their achievement, with the former group even significantly higher than the latter. The 4A-TV had also reached a higher level of achievement than the 4/5A group. It was not possible to report a reliable mean score in Total Achievement for the fifth-grade groups since the Metropolitan Test had only been administered in the school district to a very few of these students.

The fact that the TV and the control groups are not perfectly equated in these basic aptitude variables is a reflection of the selection procedures described

under Research Design. The inevitability of the problems involved in this selection has also been noted, as has the assurance that statistical matching will be used when these groups are compared in the Results section of this report.

RESULTS

HYPOTHESIS I

Those superior students who enroll in the Russian course will improve in achievement in other subject matter in their regular classwork, and will show more gain in such achievement than average students enrolled in the Russian course or than superior students who are not enrolled in the course.

In discussing the results of this hypothesis, we will separate the performance of the students who started in the fourth grade from those who started this project in the fifth grade. The results of these two groups are somewhat different, particularly because those who began the project in the fifth grade were in junior high school for their third and final year of the project.

Fourth Grade

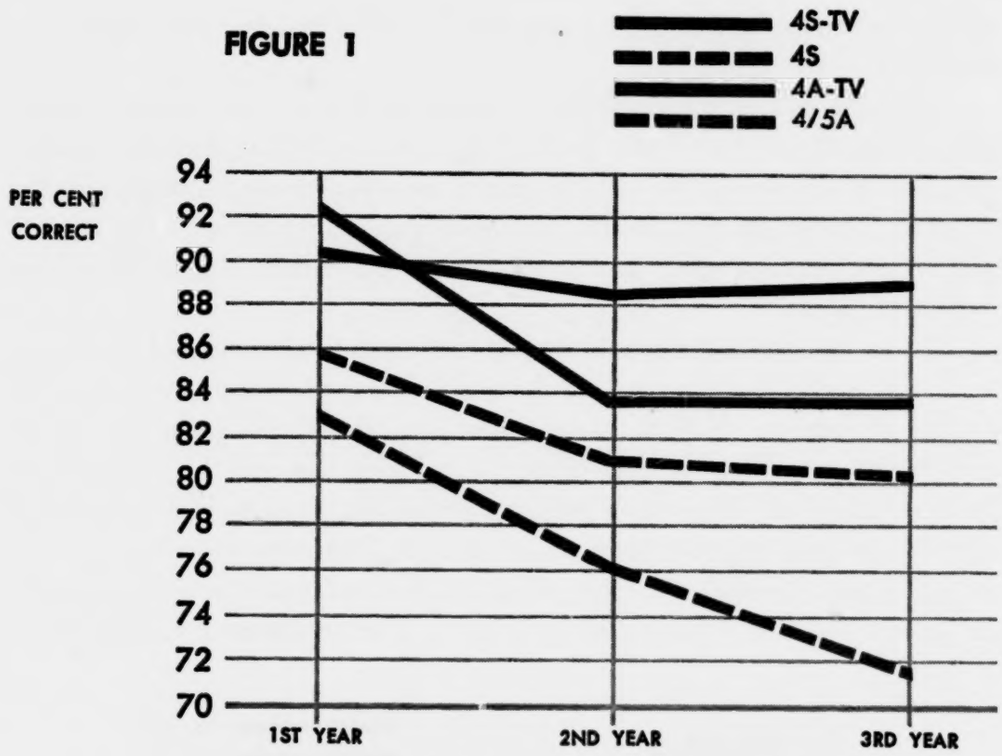
Science. The progress of the students in four academic areas was observed over the three project years. Starting with the academic area of Science, Figure 1 shows the over-all results of the fourth-grade students as we followed their achievement during the three-year period: fourth, fifth, and sixth grades.

Obviously, a full set of grades could not be obtained on all students during these three years due to drop-outs, absences, etc. Figure 1 contains the "maximum entry" (the greatest number available) of student scores in each of the three years. Therefore, not only do the four groups differ from each other in size, but also any one group may have a different number of students' grades for that period of time.

Even a hasty scanning of this figure indicates that Science grades generally decreased across the three-year period. This is an unexpected result and is an interesting reflection of the grading system of our participating schools. This over-all decline in grades will also be noticed in other areas of achievement further on in the report. It would appear that the superior students who were enrolled in Russian had the least amount of decline for the three years. Indeed, this decrease by the superior students enrolled in Russian (4S-TV) is significantly[1] less than the drop in Science grades shown by the superior students not enrolled in Russian (4S) and the average students[2] (4A-TV) enrolled in Russian. This gives general support to Hypothesis I, except that the

[1] Probability $<$ .05, Appendix B1.
[2] Probability $<$ .06, *ibid.*

FIGURE 1



Achievement in Science for Maximum-Entry Groups

difference among these groups is a matter of relative *decrease* in grades instead of relative *improvement* in grades. While not a part of Hypothesis I, it can, nevertheless, be noted that the average students in Russian, although dropping in their Science grades, dropped less than their average counterparts who were not enrolled in Russian. This difference, however, is not statistically significant.

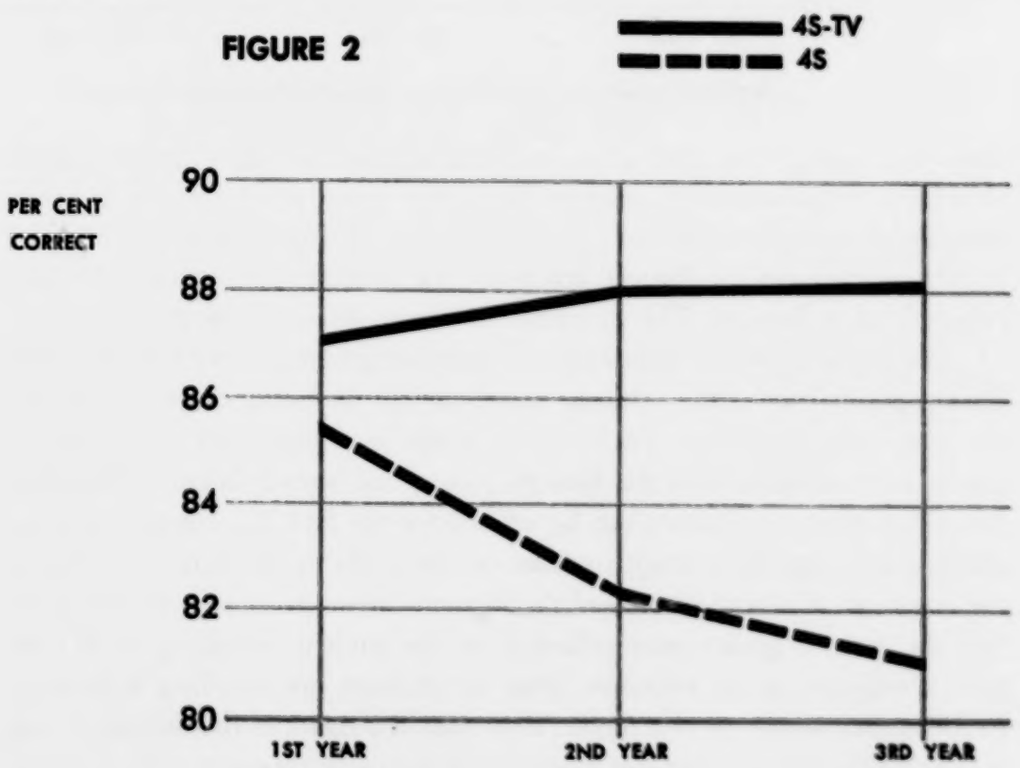
It will also be observed that the two superior groups did not have the same Science grades even at the first-year mark, nor did the two average groups have the same level of Science performance at the first-year mark. The Science grades were collected after the Russian project had already begun. Therefore, two alternative explanations can be offered for the fact that equated superior students and equated average students do not perform the same even during the first year. Either the effects of the Russian class were already occurring before the Science grades were collected, or the students enrolling in Russian were a different group somehow from the students not enrolling in Russian. In the earlier section of this report, Basic Characteristics of the Sample, it was noted that the TV and Control groups were not perfectly equated for aptitude. Nevertheless, the evidence about to be presented supports the former hypothesis

more firmly, that is, Russian was beginning to take its effect even during the first year.

To begin with, it will be observed that in the first year the average students enrolled in Russian were even performing better in Science than the superior students. Since average students in general should perform more poorly than superior students, we can assume that the average students enrolled in Russian had indeed received some sort of stimulation from their Russian classwork before this point.

To further check the possibility that the students who enrolled in Russian were not markedly different from those who did not enroll in Russian, a sub-sample of matched students was prepared from the 4S-TV group and the 4S group. The matching variables were IQ and total score on the Metropolitan Achievement Test. This was a person-to-person matching on both variables so that the comparison could be made of a group of superior students in Russian which perfectly paralleled in terms of IQ and standardized achievement a group of superior students not enrolled in Russian. The results are presented below in Figure 2.

FIGURE 2



Achievement in Science for Matched Groups

Figure 2 shows basically the same results as those in Figure 1, with perhaps even greater emphasis on the difference in Science performance of these two matched groups. This difference between groups across the three years is again statistically significant.[3]

One could further argue that even when superior students are matched on IQ and standardized achievement, they may still differ in motivation and interest. No such measure of motivation was available prior to starting this study, and we were not able to select randomly those superior students who would be enrolled in Russian. The possibility then of initial motivation cannot be tested, except for the indirect evidence that the matched groups in Figure 2 should also contain equal numbers of under-achieving and over-achieving students and therefore should not differ greatly in that aspect of motivation.

Thus we can conclude in terms of this particular subject matter that Hypothesis I is confirmed. Specifically, *those superior students who enrolled in the Russian course showed less of a drop in Science than did average students enrolled in the Russian course or superior students not enrolled in the course.*

Social Studies. The next comparison of those students who began this project in their fourth grade will be their achievement in Social Studies. Figure 3 shows the annual scores they received during the three years. Again, this is a maximum-entry table, showing the means of all the scores that were available on the students who completed three years in this project.

As in the case of Science grades, the over-all performance of the students decreases across the three years. The students' grades in Social Studies within any one year generally went up from the midterm score to the final score, (paralleling what occurred in Science). This was true for both the superior groups and for the average group of students enrolled in Russian; however, the average students not enrolled in Russian tended to show a loss within each year. It is the move from one year to the next that accompanies the drop in grades for most of these students.

An inspection of Figure 3 suggests the same results as noted in Figure 1 for the academic area of Science. However, statistical tests indicate that the drop in grades by the superior students enrolled in Russian is not any less than the drop of grades from their superior counterparts not enrolled in Russian. Once again though, the drop in grades by the superior students in Russian is significantly[4] less than the drop shown by the average students enrolled in Russian. Further, in Figure 3 the two average groups do not differ significantly in their amount of loss over the three years.

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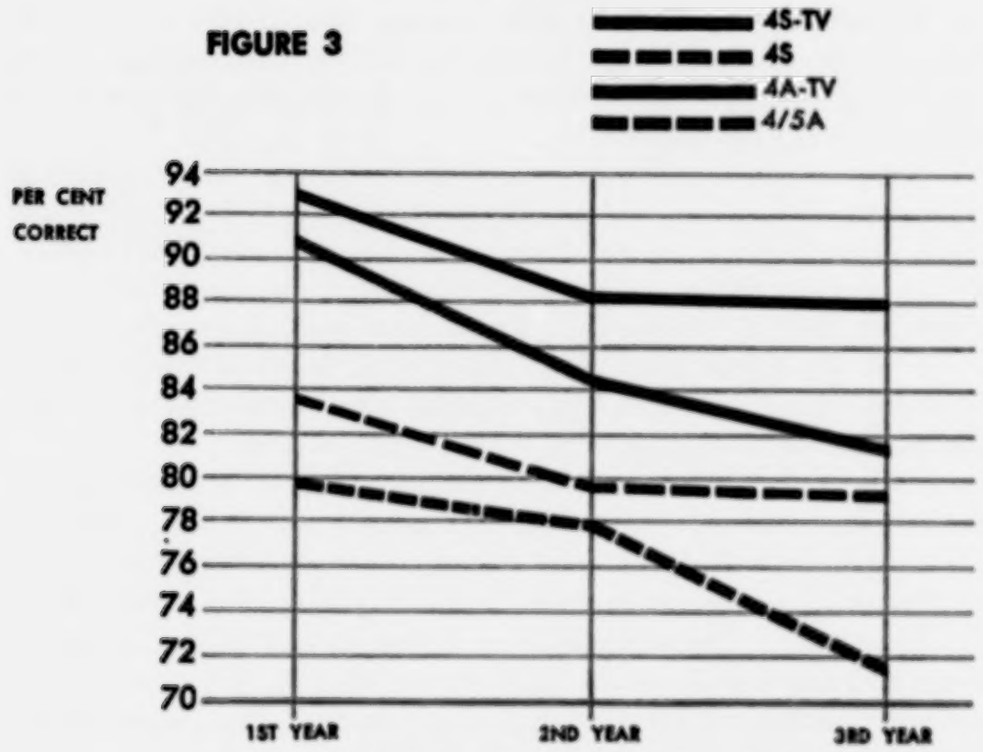
[3] Probability $<$ .05, Appendix B2.

[4] Probability $<$ .01, Appendix B1.

FIGURE 3



Achievement in Social Studies for Maximum-Entry Groups

Looking at the left side of the graph, the scores in Social Science for the first year only, the average students in Russian did nearly as well as the superior students in Russian and considerably better than the superior students not in Russian. This suggests again that the average students were already stimulated by their enrollment in the Russian course and that it affected their grades in Social Studies even in this first year.

Because the two groups of superior students are so far apart even in the first year it is again important to note what happens across the three years when two groups of superior students are compared who have first been matched on IQ and total achievement scores on the Metropolitan Achievement Test. This is the same procedure that was used in preparing Figure 2 in the discussion on Science achievement. The plots of these two subsamples of matched persons are presented in Figure 4.

Both lines show approximately the same amount of decrease in grades across the three years, i.e., there is no significant difference between the amount of decrease. However, these two lines are separated;[8] that is, the over-all per-

[8] Probability $< .09$, Appendix B2.

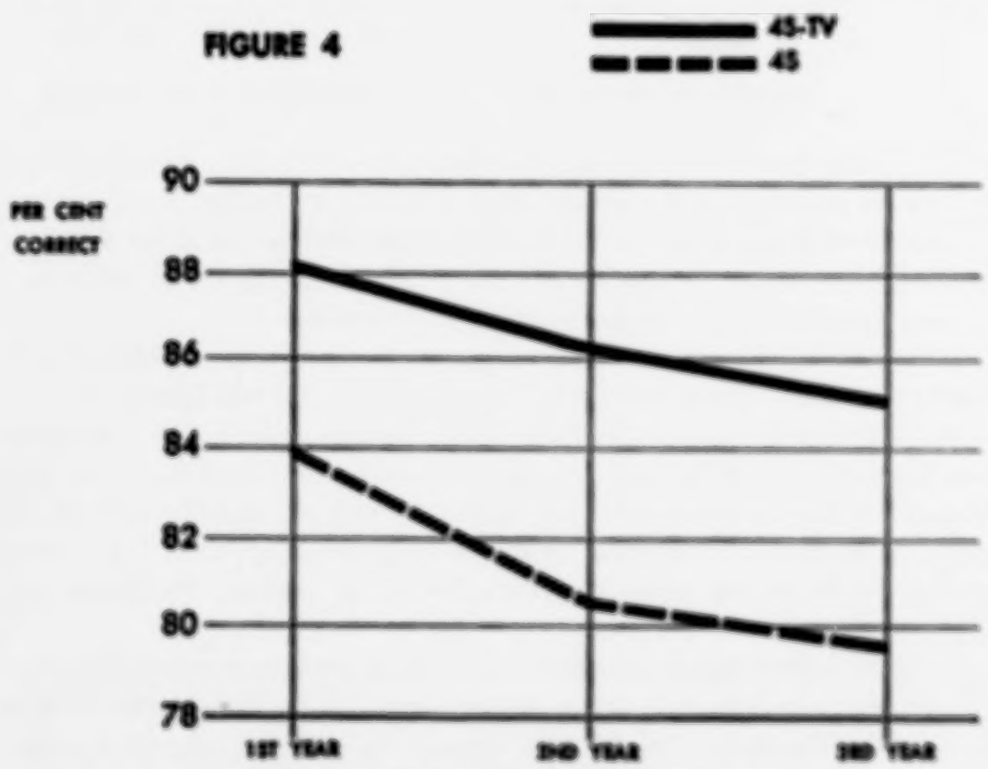
formance in Social Studies by the superior students enrolled in Russian remains higher than that of the superior students not enrolled in Russian. Thus, even when these two groups of superior students are matched for IQ and basic achievement, the apparent difference in stimulation produced by the enrollment in Russian that was noticed in the first year continues through the two remaining years.

Hypothesis I is, therefore, partially supported by the findings in the academic area of Social Studies. It can be stated that *those superior students who enrolled in the Russian course showed less of a drop in Social Studies grades than those average students also enrolled in the Russian course, and continued to perform better than the superior students who were not enrolled in the Russian course.*

Arithmetic. Next the subject of Arithmetic will be discussed as it related to Hypothesis I. The maximum-entry plots are shown on the following page.

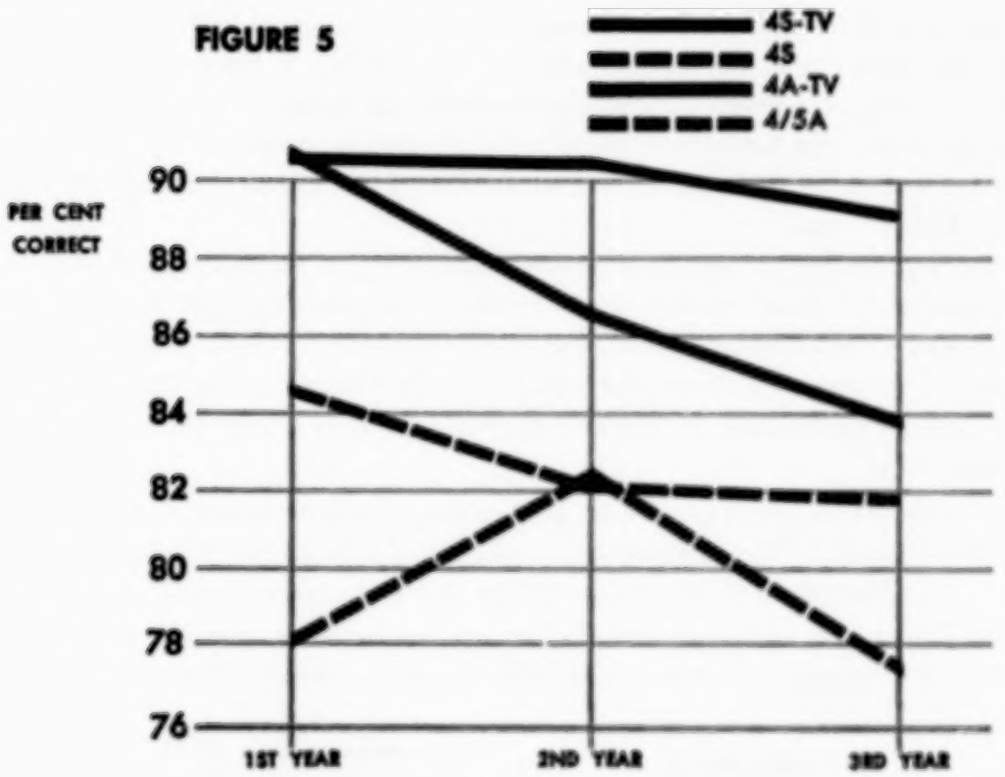
The downward trend of these grades across the three years is seen in Figure 5 with the exception that the average students not enrolled in Russian showed a second-year gain before their third-year decline. However, in spite

FIGURE 4



Achievement in Social Studies for Matched Groups

FIGURE 5



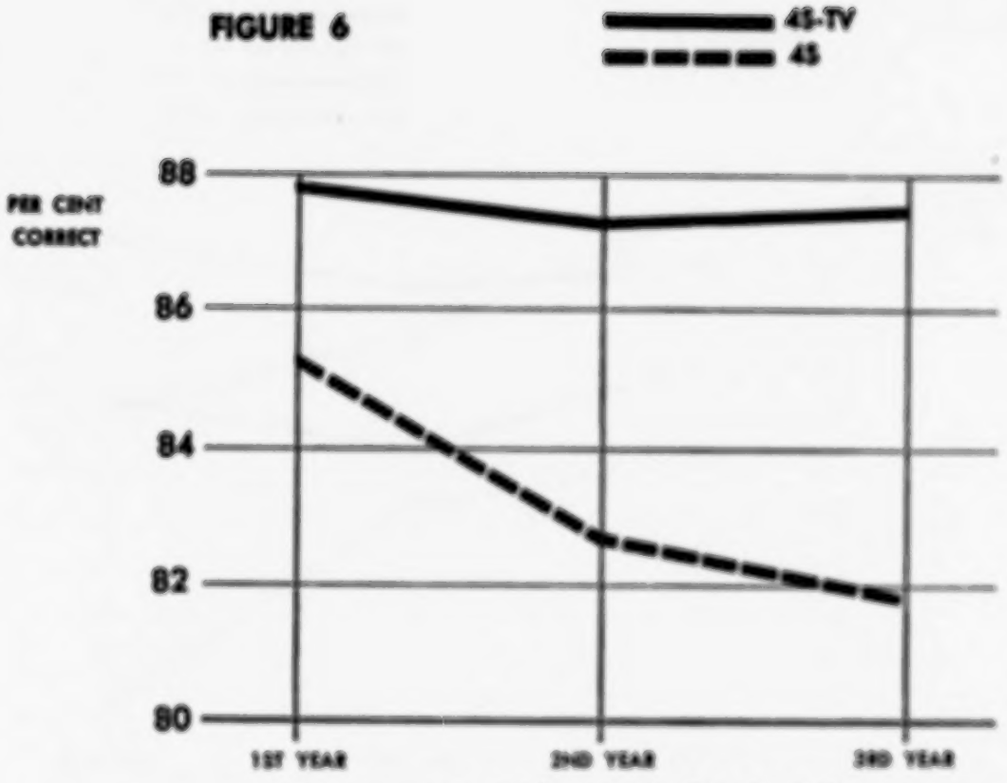
Achievement in Arithmetic for Maximum-Entry Groups

of the visual appearance of these lines, statistical tests indicate that there is no significant difference in the amount of drop shown among the various groups. In other words, all groups shown on the graph dropped by about the same amount. Enrollment in Russian did not produce any significant differences among these students in their achievement in Arithmetic.

The Arithmetic grades within each year remain rather unchanging from midterm to final. There was not the inter-year gain that was noticed above in Social Studies and Science. One interesting exception to this is that in the third year those superior students not enrolled in Russian did show a significant gain and in the final grade of that year caught up with the superior students enrolled in Russian. This general result can be observed in Figure 5 by noting that the superior non-Russian students leveled off between the second and third years.

Figure 5 illustrates an example of the average students enrolled in Russian performing as well in their first year's Arithmetic as did the superior students in Russian. This is more of the same indirect evidence that suggests the effect enrollment in Russian had (even within the first year) on these average students.

FIGURE 6



Achievement in Arithmetic for Matched Groups

Since the superior students not enrolled in Russian once again show a lower performance in a subject matter during the first year than do their superior counterparts in Russian, we must compare these two superior groups after they have been carefully partitioned into the two matched (on IQ and general achievement) subsamples. The results are shown in Figure 6.

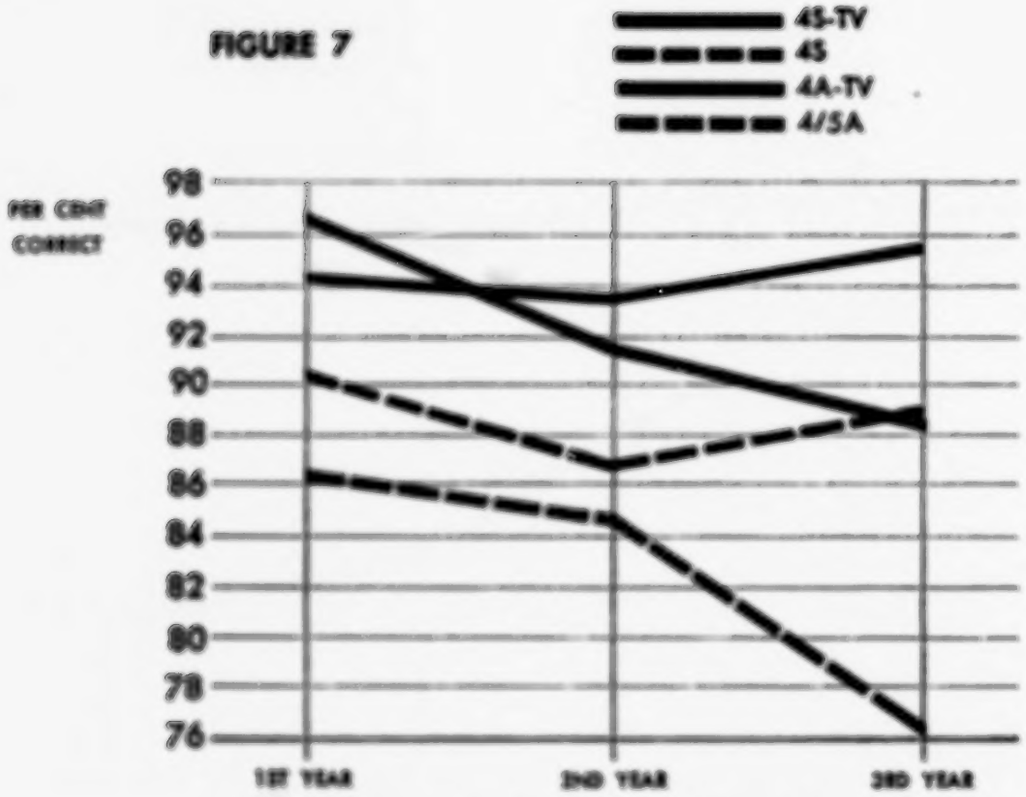
Although there is the same tendency for the superior students enrolled in Russian to maintain a better performance in Arithmetic than those not enrolled in Russian, nevertheless, there is no significant difference between the separation of these curves or their slopes.

In view of the above results, it must be concluded that Hypothesis I was not supported in the achievement of Arithmetic. The superior students enrolled in Russian neither gained more nor lost less than the average students enrolled in Russian or the superior students not enrolled in the course.

Spelling. The final area of academic achievement is that of Spelling. The three-year plot of maximum entries is shown in Figure 7.

Here for the first time our plot has changed somewhat. The superior groups of students do not show the drop across the three years that was ob-

FIGURE 7



Achievement in Spelling for Maximum-Entry Groups

served in the other three areas of subject matter. After a second-year drop both groups of superior students show a return to a higher performance again. This trend shown by both of the superior groups is very different from the downward path shown by the two average groups. This difference in trends is highly significant.[6] However, there is no significant difference between the plots of the two superior groups. The superior students enrolled in Russian showed no difference in performance change across the three years from those not enrolled in Russian. Furthermore, the difference between the two average groups is not significant in amount of drop. Enrollment in Russian did not affect the rate of loss in Spelling across the three years by these two average groups. As might be expected from the graph there is a significantly[7] greater drop by the average students enrolled in Russian when compared to the superior students enrolled in Russian.

Within each year's performance there was no outstanding change in Spelling grades from the midterm to the final. This was true for all four groups.

[6] Probability < .001, Appendix B1.
[7] Probability < .01, ibid.

In Figure 7 the two superior groups do not appear so far apart in their first year. When this plot is redrawn for the matched subsamples of superior students in Russian and not in Russian, we have the results shown in Figure 8.

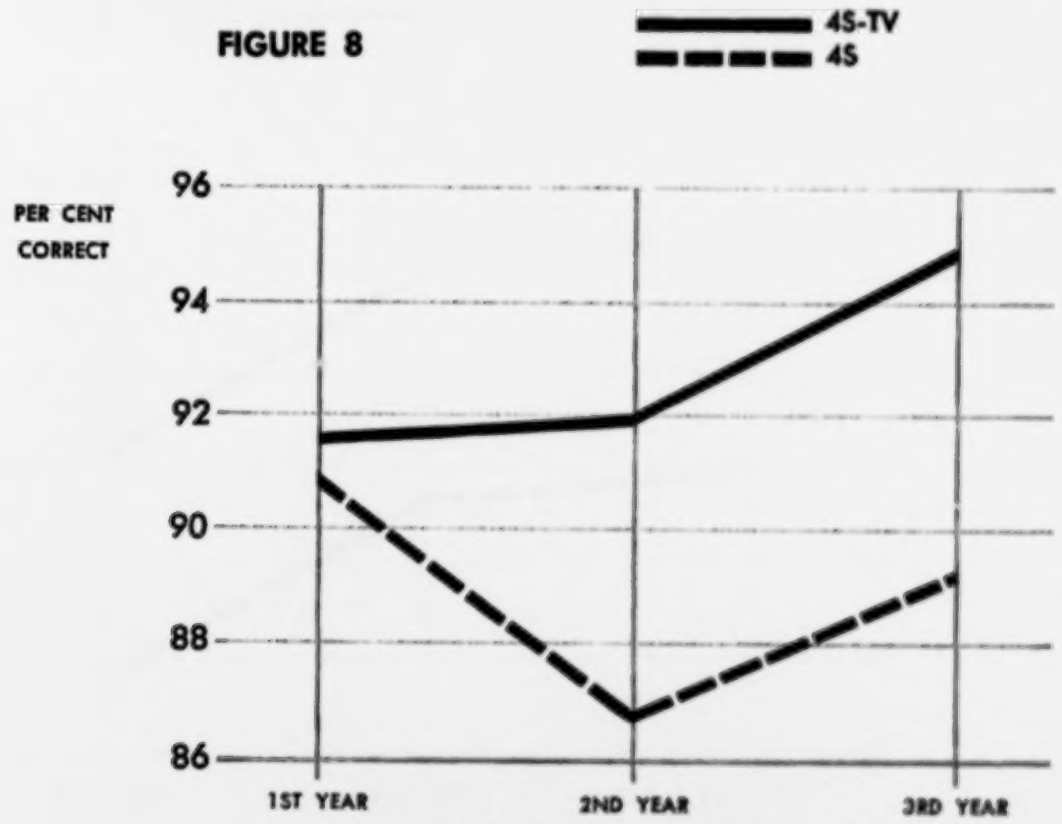
This figure shows clearly that these two groups were at about the same level in the first year. Although the two lines tend to separate in this figure, this degree of separation is not statistically significant.

In terms of Spelling performance then, Hypothesis I is only partially supported. Those superior students enrolled in Russian do gain more in the area of Spelling than do the average students enrolled in Russian; however, the 4S-TV do not gain more than the 4S. This suggests that differences in Spelling were not as much a function of Russian enrollment as they were a function of differences in the basic ability of superior versus average students. Yet, as will be noted under Hypothesis III, Spelling ability has an interesting relation to Russian achievement.

Fifth Grade

The following discussion deals with the performance across three years for those students who began in their fifth grade and continued into junior high

FIGURE 8



Achievement in Spelling for Matched Groups

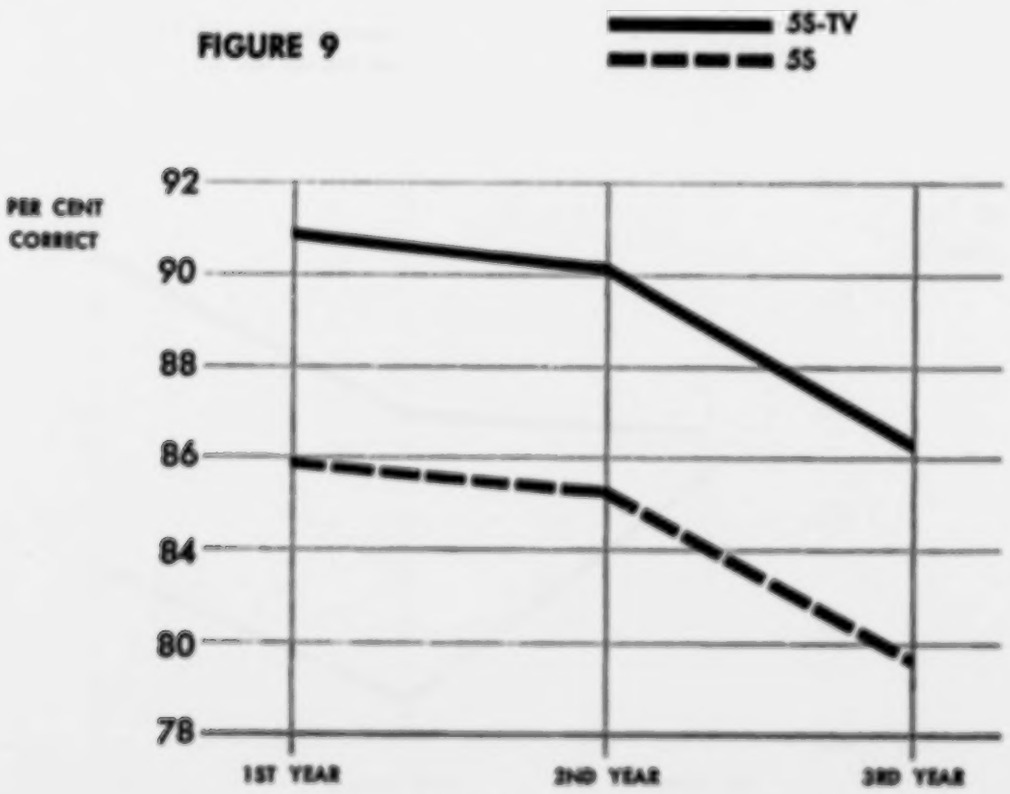
school. This group of pupils contains only superior students for the purposes of our analysis, since there were not enough average students in the fifth grade to constitute a unique group.

Science. Starting with academic scores in Science, Figure 9 shows the maximum-entry plots for the superior students enrolled in Russian contrasted to those superior students not enrolled in Russian.

The over-all trend of both groups in the figure below is downward with a sharper drop as they move into the third year of the project; that is, as they enter junior high school. These two curves are basically parallel. The two groups of superior students do not differ significantly in the rate of change.

As with the fourth graders, here, too, a difference between these two groups exists in their first year's grades. Since the Metropolitan Achievement Test was never administered to these students, preparing matched groups of superior students in Russian and not in Russian had to be done in a different manner. Because of this difficulty the groups were matched on their first-year midterm scores in Science. Thus, ignoring any effects that enrolling in Russian might have had for the first half of the initial year, we produce subsamples of

FIGURE 9



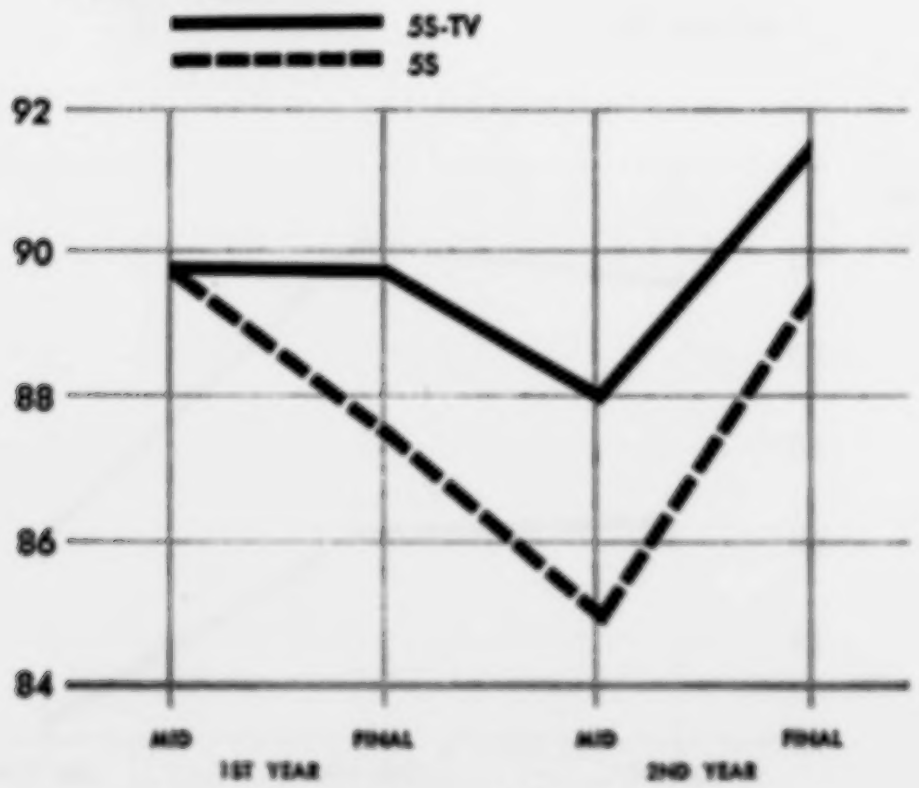
Achievement in Science for Maximum-Entry Groups

these two superior groups who are equal in their Science achievement because they have been matched person-to-person on this midterm score. Further, since the entrance into junior high school was apparently equally devastating to both groups, this latter portion of the data was omitted in the graphing of their results. Therefore, Figure 10 shows the performance of the two matched subsets across the first two years only, and also includes both the midterm and final grades for each of these two years.

In Figure 10, it should be noted that the two samples begin together (because of the matching procedure) and then slightly separate across the remaining time periods. The difference between these two lines is not statistically significant.

Therefore, it must be concluded that Hypothesis I was not supported on these fifth-grade students on the achievement area of Science, in spite of the fact that the hypothesis was supported on the fourth-grade students as noted in an earlier section. In this fifth-grade sample, enrollment in the Russian course was not related to performance in Science across the time period.

FIGURE 10



Achievement in Science for Matched Groups

Social Studies. Figure 11 shows the maximum-entry plot across the three years.

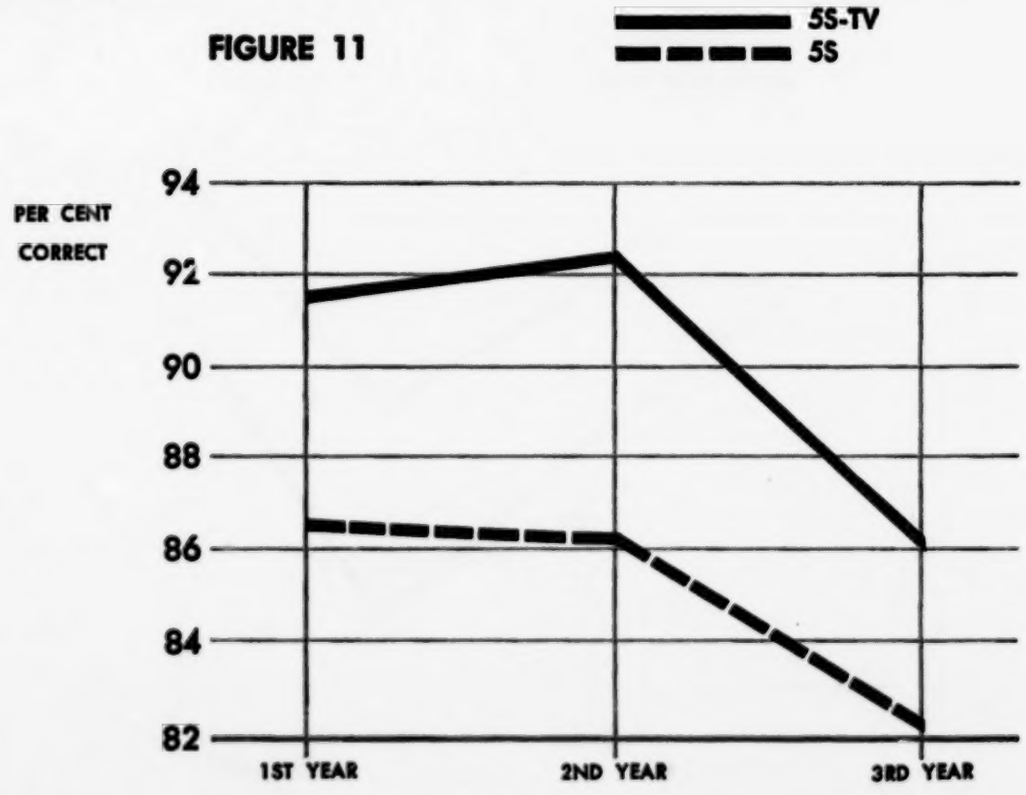
The junior high school drop (third year) is still apparent; however, the performance from the first year to the second year does not show the typical drop. Nevertheless, there is no significant difference in the rate of gain or loss for these two groups of superior students.

Preparing two subsamples who are matched person-to-person on their first-year, midterm grade in Social Studies, we have the results shown in Figure 12.

This chart shows the performance of the students on both the midterm and final grades in Social Studies for the first two years, and as in Figure 10, eliminates the third year. The slight differences in the two lines in Figure 12 are not statistically significant. Therefore, Hypothesis I is not supported by the performance of the 5S-TV versus the 5S group, in contradiction to the partial support that was given to Hypothesis I in the Social Studies area for the 4S-TV and 4S groups.

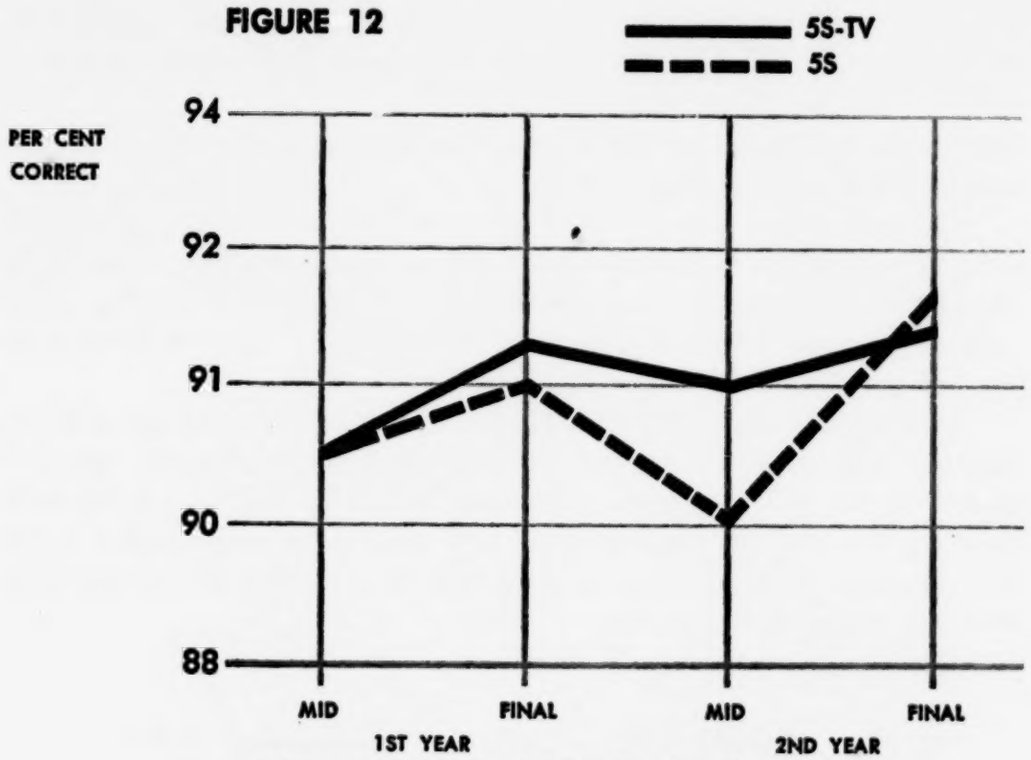
Arithmetic. Figure 13 shows the maximum-entry plots for the fifth-grade students.

FIGURE 11



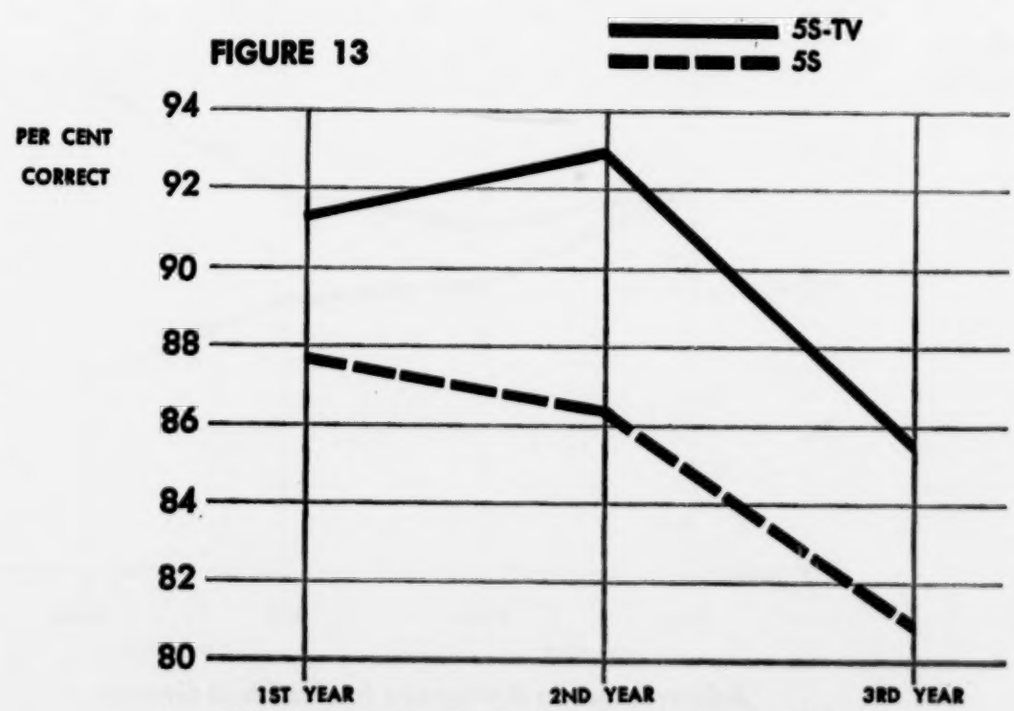
Achievement in Social Studies for Maximum-Entry Groups

FIGURE 12



Achievement in Social Studies for Matched Groups

FIGURE 13



Achievement in Arithmetic for Maximum-Entry Groups

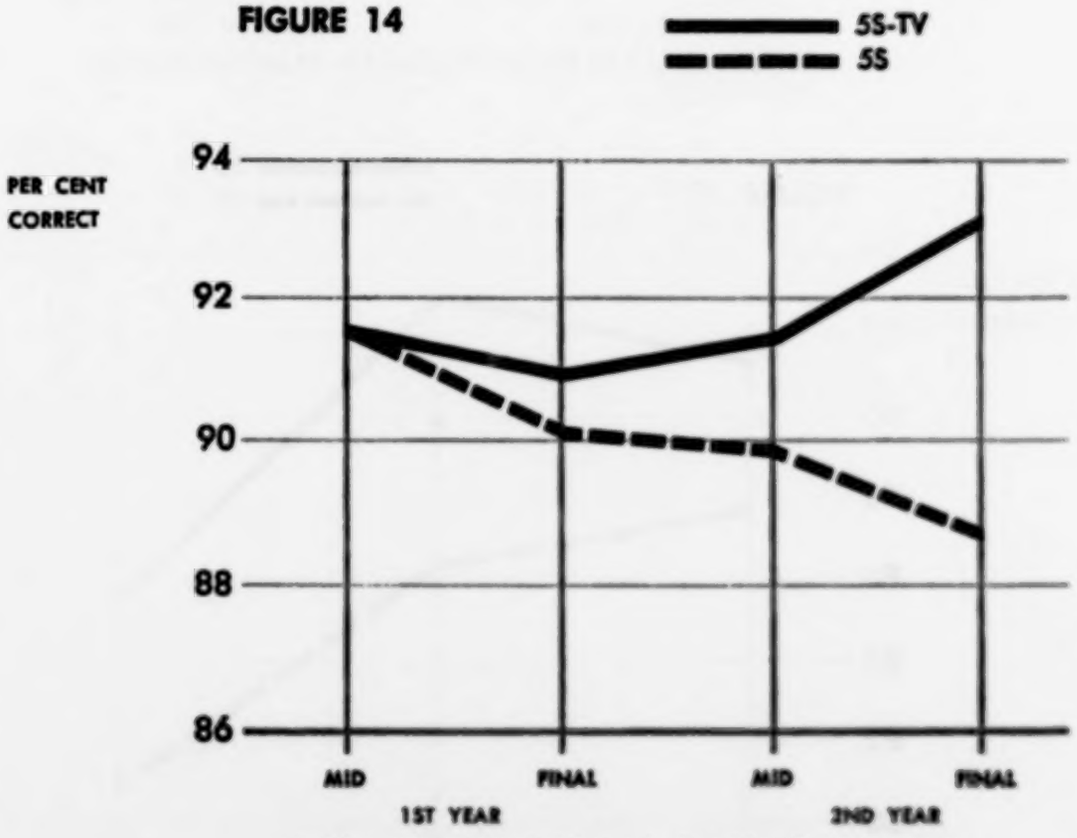
Again these two groups of superior students do not differ significantly in their over-all drop from the fifth grade to junior high school. However, when we matched these groups according to their first score at the midterm on Arithmetic, we find that the performance of these two groups was indeed different. This is shown in Figure 14.

Although forced to begin at the same point by our matching procedures, the superior students in Russian show a gain in their Arithmetic scores by the end of the second year while their matched counterparts were showing a loss for the same time period. This difference is significant.[8] The maximum-entry plot in Figure 13 also reflects this difference.

In achievement in Arithmetic, Hypothesis I is supported by the performance of the 5S and 5S-TV students, although this hypothesis was not supported by the 4S and 4S-TV students. In contrast to the fourth-grade sample then, these superior students starting in the fifth grade who were enrolled in the Russian course show more gain in Arithmetic than do those superior students who were not enrolled in the Russian course.

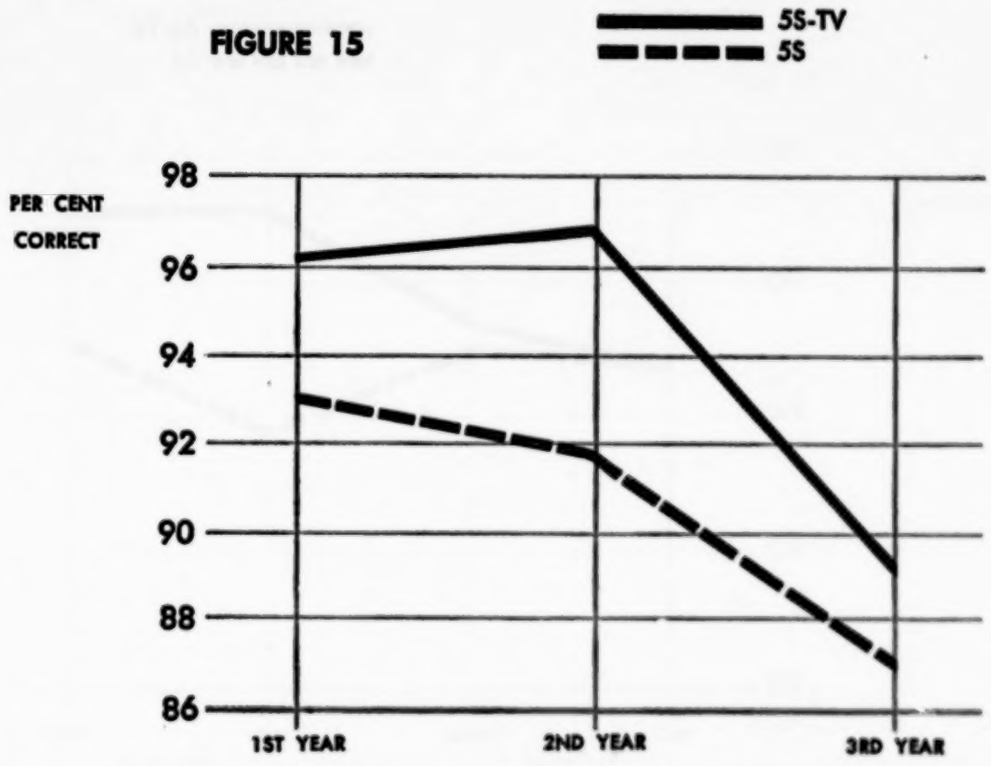
[8] Probability < .05, Appendix B2.

FIGURE 14



Achievement in Arithmetic for Matched Groups

FIGURE 15



Achievement in Spelling for Maximum-Entry Groups

Spelling. A pattern of results very similar to that found in Arithmetic is also found in Spelling achievement. The maximum-entry plots are shown in Figure 15.

The two superior groups appear to show a separation in their second year while both drop upon entry into junior high school in the third year. This difference in drop from the first to the third year is not significant.

When the two superior groups are matched on their midterm scores in Spelling during the first year, we have the results shown in Figure 16.

The separation shown by these two lines is significant statistically.[9]

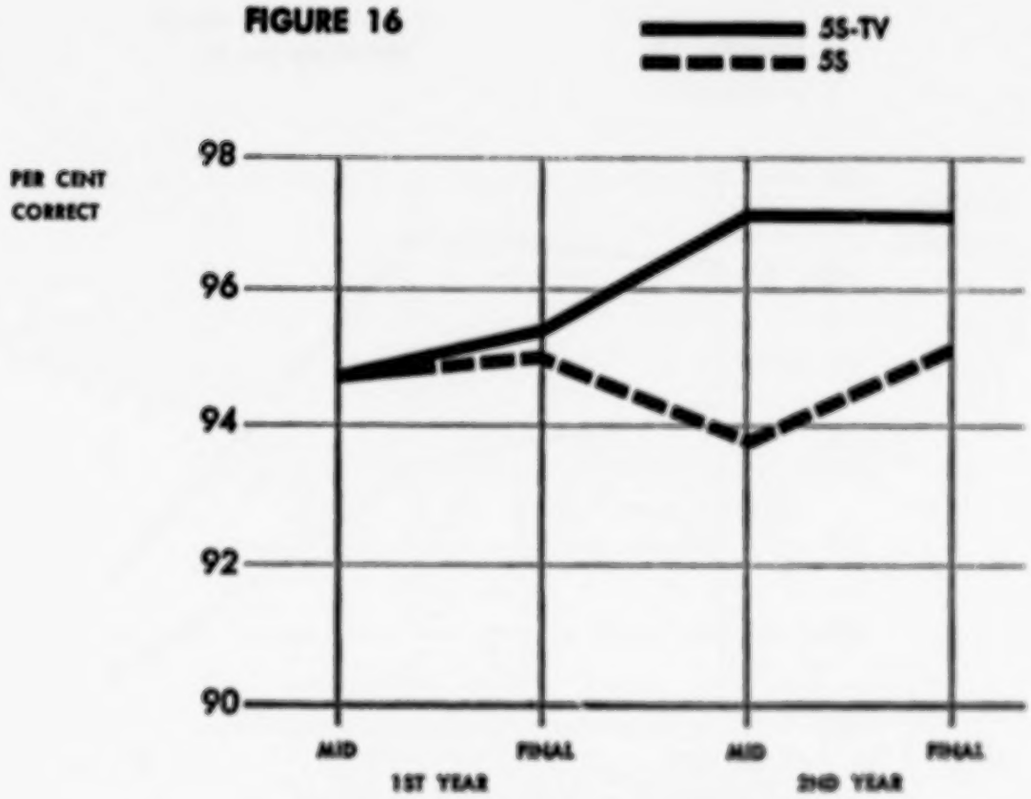
Therefore, Hypothesis I is supported in the area of Spelling for the fifth graders, as it is partially supported also by the performance of the fourth-grade students.

HYPOTHESIS II

Those superior students who enroll in this class will become less of a problem to their teachers than they were before — and will be less of a problem than superior students who do not enroll in the course.

[9] Probability $< .01$, *ibid.*

FIGURE 16



Achievement in Spelling for Matched Groups

The thinking behind this hypothesis came from the familiar assumption that gifted or superior students can become socio-emotional problems to their teachers when these students are not sufficiently challenged by their daily classwork. However, data were also being collected on nonsuperior or average students, both those enrolled in Russian and a control group who were not; therefore, the results of these average students were also included for comparison with the two groups of superior students when possible.

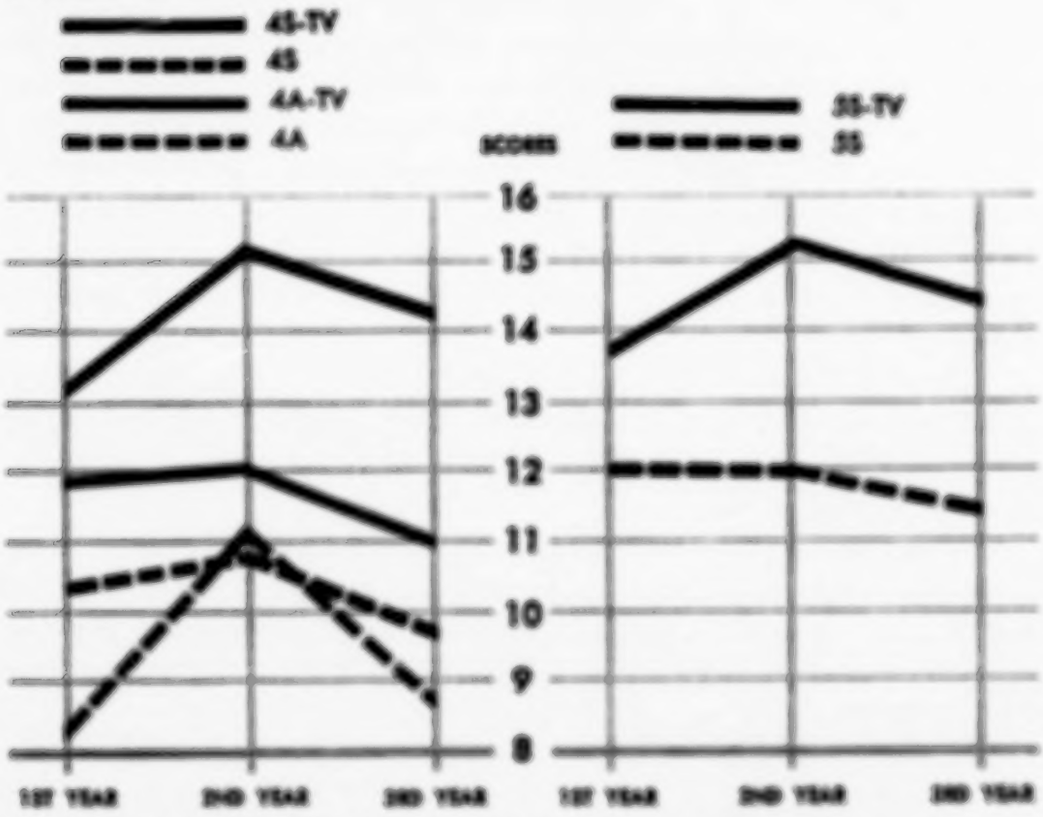
The dependent variable in this hypothesis is a rating of the socio-emotional behavior of the children as described in an earlier section. It will be recalled that this rating by the homeroom teacher included three scores.

These three scores had been determined by a cluster analysis of the intercorrelations of the behavioral items collected for this socio-emotional rating scale. Also only those items were retained for the final form of the scale which did not discriminate between the students in terms of their classroom achievement. In actuality, however, at the end of the three years an analysis of the resultant correlations found that the three scores or subscales (Self-Initiated Drive, Leadership, and Emotional Control) had intercorrelations ranging from

.52 to .74. Hence, it will be noted in the discussion to follow that the results for the various groups on these three subscales are quite similar across the three years. Further, it appears that the homeroom teachers who made the socio-emotional ratings were influenced by each student's achievement in his regular classwork. This sort of "halo" in the ratings can be inferred from the fact that the intercorrelations between the students' achievement (Science, Social Studies, Arithmetic, and Spelling) and their ratings on the three socio-emotional scales ranged from .36 to .66.

The three scores of socio-emotional behavior do not show the gradual drop in scores from year-to-year that was evidenced in the achievement tests used in Hypothesis I. Further, there is no unique drop upon entering junior high school for those students who started the project in the fifth grade. Therefore, for the figures in this hypothesis the results of both students beginning in the fourth grade and students beginning in the fifth grade will be presented simultaneously on the same figures or charts. Figure 17 gives the maximum-entry

FIGURE 17



Rating of Self-Initiated Drive for Maximum-Entry Groups

plots across the three years for both the fourth- and fifth-grade students on the first socio-emotional dimension, Self-Initiated Drive.

Self-Initiated Drive. The superior students enrolled in Russian show higher scores in Self-Initiated Drive across all three years than do their superior counterparts who were not enrolled in Russian. This difference in the level of these two profiles is statistically significant for both the fourth-grade[10] and fifth-grade[11] plots. In addition, the 4S-TV students are significantly[12] higher on Self-Initiated Drive than were the 4A-TV students. However, since this difference in profiles is shown in all three years, we are faced with alternative questions: Were the superior students enrolled in Russian already displaying greater Self-Initiated Drive before the beginning of the Russian project than those superior students who did not enroll in Russian? Or was this difference in drive brought about by the introduction of the Russian program even within the first few weeks, so that by the time the first-year midterm rating in Self-Initiated Drive was made the two superior groups had already separated on this variable? Since there is no pre-measure available of the amount of this drive in these students for the year preceding the initiation of this study, we cannot compare or equate these two groups on initial drive. Once again, however, it is possible to prepare two carefully selected subsamples, one from each group of superior students, where individuals in each subsample are matched person-to-person on the basis of the first-year, midterm rating of Self-Initiated Drive. Thus, even if the TV and Control groups were not alike in this behavior before the Russian course began, they are now statistically forced to be identical on the basis of the teacher's first rating of this behavior. The scores of the matched 4S-TV and 4S, along with the matched 5S-TV and 5S groups, are shown in Figure 18.

The 4S-TV group is still significantly[13] higher than the 4S group, and the 5S-TV group is significantly[14] higher than the 5S group. Therefore, it would definitely appear that higher Self-Initiated Drive does accompany actual exposure to the Russian class.

Further support for the explanation that participation in Russian relates to scores in Self-Initiated Drive will be seen in a later section where the results will be shown of those students who started in the Russian program and then dropped out at the end of the first or second year. Then it will be noted that

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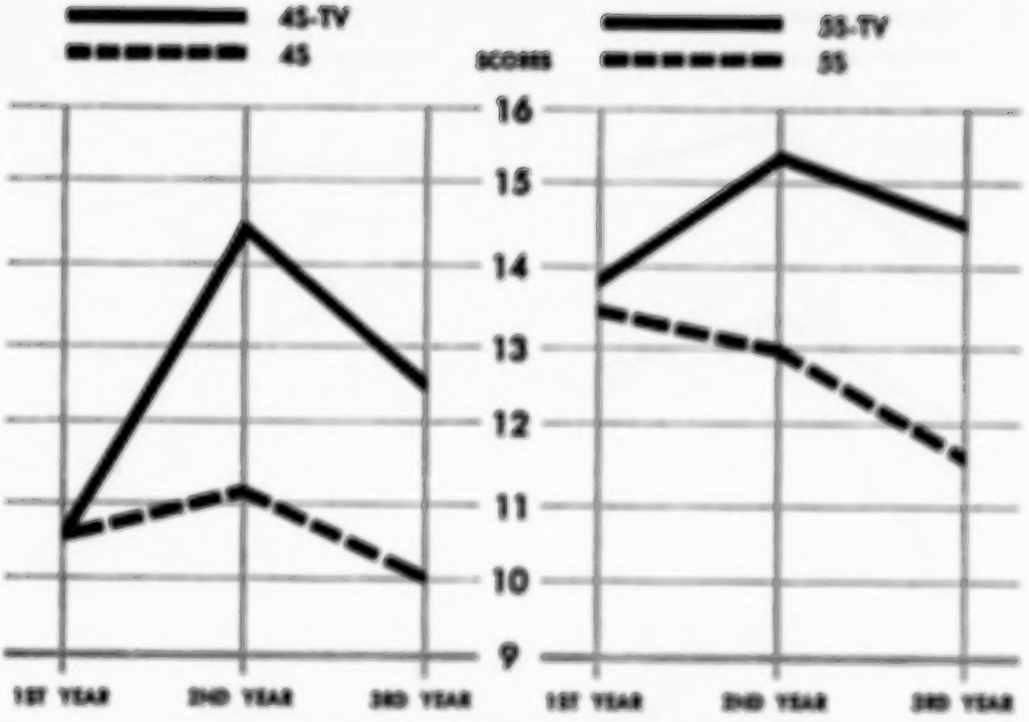
[10] Probability < .001, Appendix B1.
[11] Probability < .001, *ibid.*
[12] Probability < .01, *ibid.*
[13] Probability < .05, Appendix B2.
[14] Probability < .001, *ibid.*

FIGURE 18



Rating of Self-Initiated Drive for Matched Groups

those students who dropped the Russian program also showed a considerable drop in their Self-Initiated Drive scores.

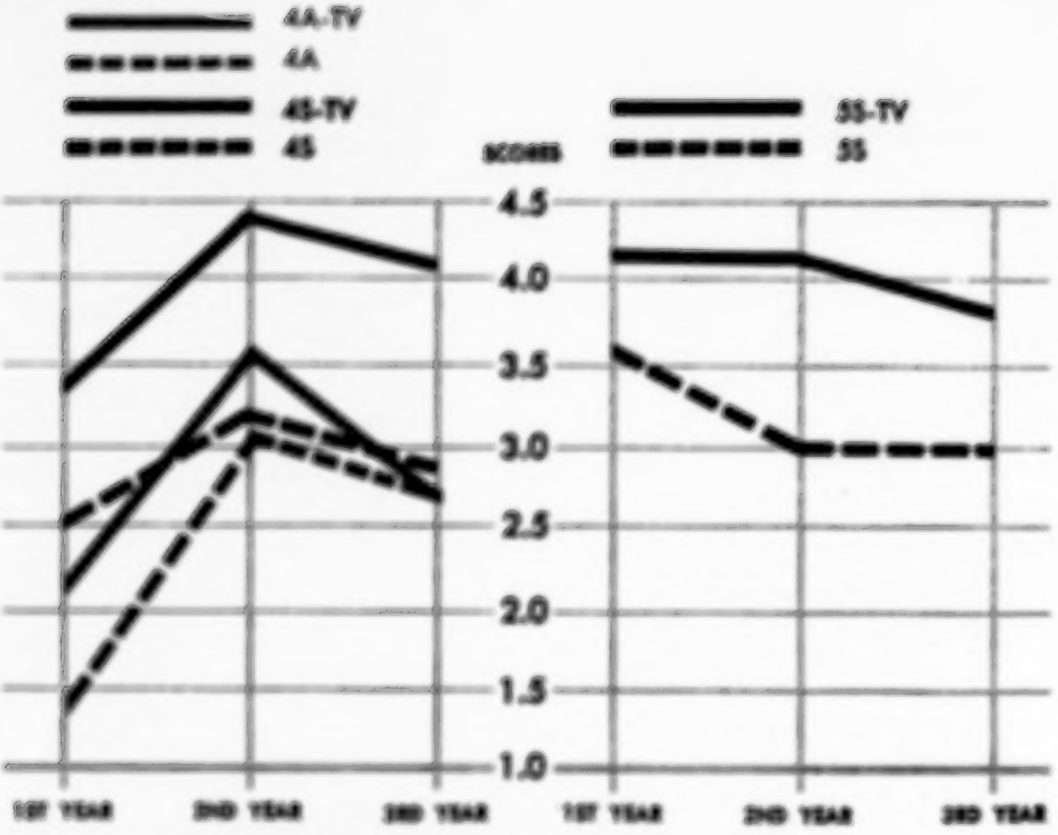
Hypothesis II is supported by this data on Self-Initiated Drive: *those superior students who enrolled in the Russian class became less of a problem to their teachers . . . than the superior students who did not enroll in the course, providing that one holds to the interpretation that students who gain in Self-Initiated Drive will become less of a problem to their teachers.*

Leadership. The next dimension of socio-emotional behavior is that of Leadership. The maximum-entry plot for this dependent variable across the three years is shown in Figure 19.

The results shown in this figure are similar to those found for Self-Initiated Drive. The Leadership scores of the 45-TV students are significantly higher across the three years than those of the 45 students. This difference is statistically significant.[15] The difference between the scores of the 55-TV stu-

[15] Probability < .001, Appendix B1.

FIGURE 19



Rating of Leadership for Maximum-Entry Groups

dents is also significantly[14] higher than those for the 5S students. Also, the 4S-TV students have higher[15] scores in Leadership than the 4A-TV students. The 4A-TV students have Leadership scores very similar to those of the 4S students.

Figure 20 shows the results of the two subsets of superior students matched person-to-person for initial rating on Leadership.

Even when matched for the first rating these groups remain apart. For the 4S-TV and 4S groups this difference in levels is not statistically significant; however, group 5S-TV is still significantly[16] higher in Leadership than group 5S.

Again this tends to support the explanation that the difference in scores in Leadership came about after the Russian program had began. In a later section which deals with the performance of those who dropped the Russian program, it will further be noticed that those who dropped the program at the end of the

[14] Probability $< .05$, *ibid.*
[15] Probability $< .001$, *ibid.*
[16] Probability $< .01$, Appendix III.

first year showed a loss in Leadership scores while those who dropped the program at the end of the second year showed virtually no loss.

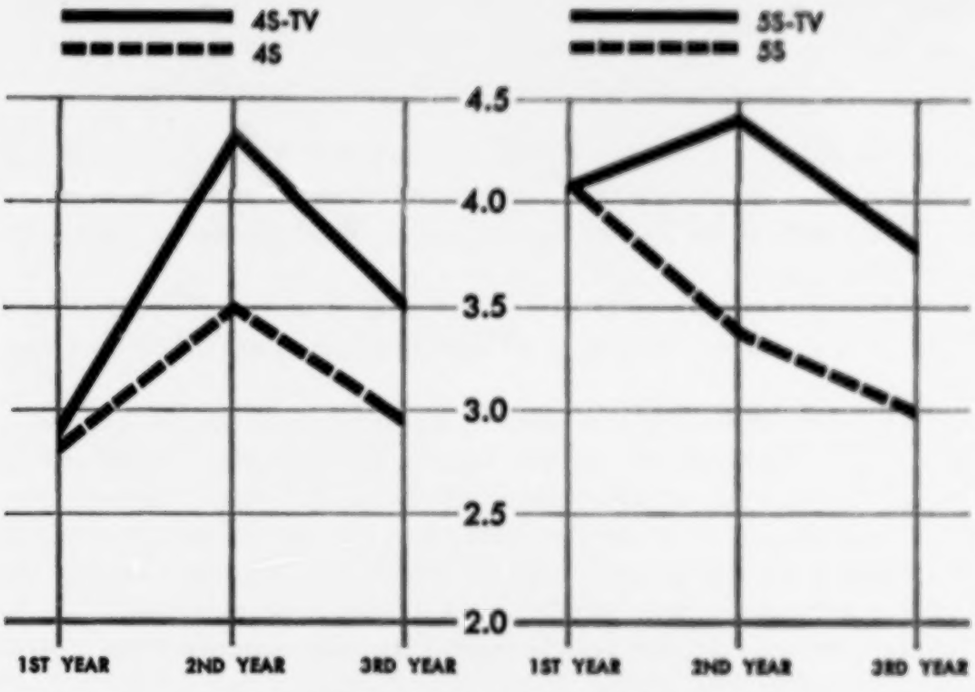
Hypothesis II is partially supported in the area of Leadership behavior, then, with enrollment in the Russian program accompanying high scores in Leadership. It is assumed that those students who show more Leadership behavior were less of a problem to their teachers.

Emotional Control. The last category of socio-emotional behavior is Emotional Control. The maximum-entry plots are shown in Figure 21.

The yearly results shown in this figure are very similar to those in the figures of the two preceding socio-emotional variables. The three years of scores for the 4S-TV students are significantly[19] higher than the scores for the 4S students and are significantly[20] higher than the 4A-TV students while the

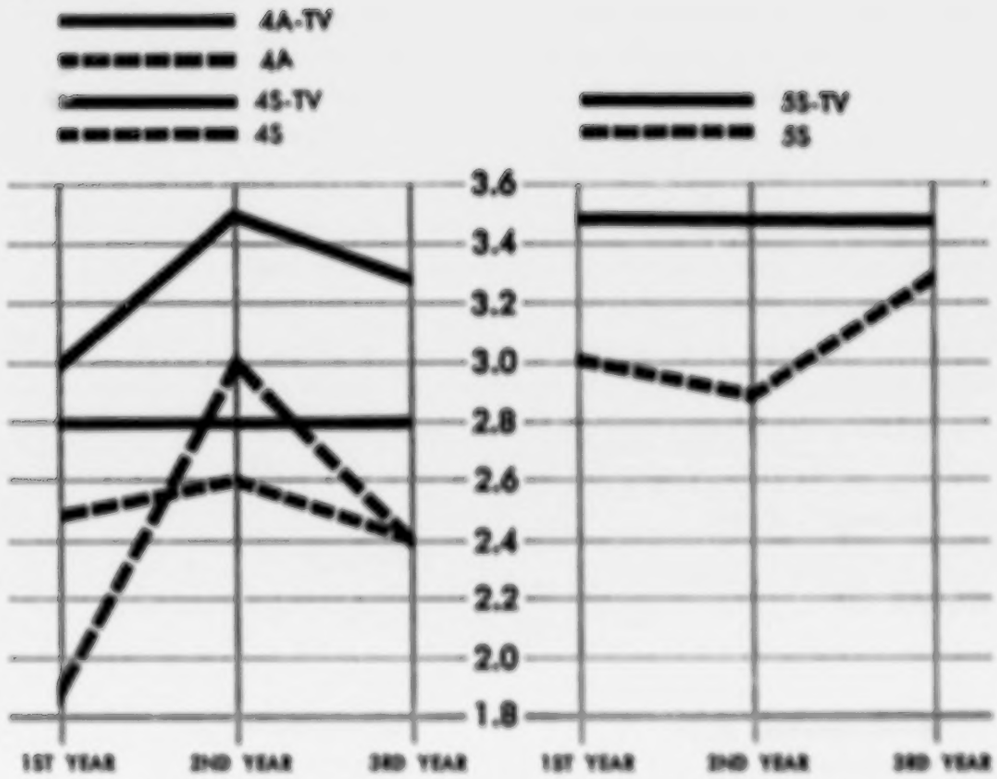
[19] Probability < .001, Appendix B3.
[20] Probability < .01, *ibid.*

FIGURE 20



Rating of Leadership for Matched Groups

FIGURE 21



Rating of Emotional Control for Maximum-Entry Groups

scores for the 5S-TV students are also significantly[31] higher than for the 5S students. Here too, the 4A-TV students are behaving like the 4S students.

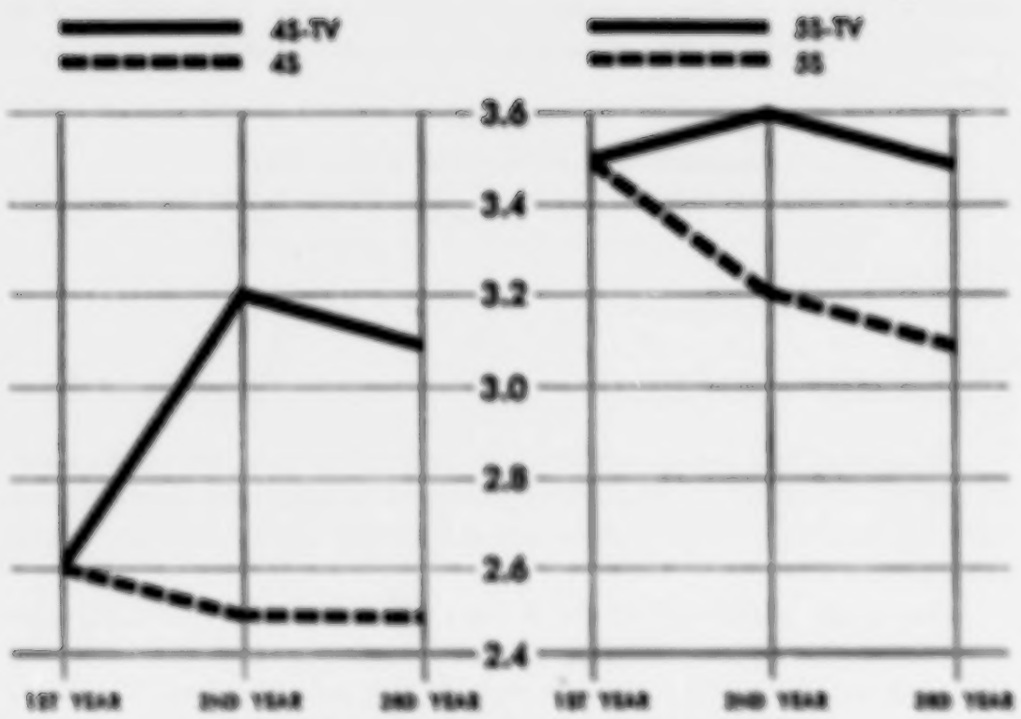
The results of the subsamples matched on initial Emotional Control are shown in Figure 22.

Again the separation of these lines for the 4S-TV and the 4S groups are not statistically significant, but the 5S-TV is higher[32] in Emotional Control than the 5S group.

Therefore, Hypothesis II is generally supported in all three of these measures of socio-emotional control. The superior students who were enrolled in the Russian class showed more Self-Initiated Drive, more Leadership, and more Emotional Control across the three years than the superior students who did not enroll in the Russian course. In the eyes of their homeroom teachers the superior students who were enrolled in the Russian program behaved throughout the three years in what could be defined as a more mature manner in their

[31] Probability < .05, *ibid.*
[32] Probability < .01, Appendix B2.

FIGURE 22



Rating of Emotional Control for Matched Groups

socio-emotional components than did those superior students who did not choose to take the Russian course.

HYPOTHESIS III

Even among superior students (enrolled in Russian) there will be individual differences in ability to learn Russian. These differences can be predicted from scores on tests of language skill. However, these differences in success in Russian will not interact with Hypotheses I and II.

This hypothesis was investigated in two parts, with the last sentence in the hypothesis above constituting the second part. The data collected relevant to the first part of this hypothesis deals with the prediction of scores on Russian tests from scores of tests on language skill.

Before describing an attempt to predict Russian scores, the Russian scores themselves must be examined. As described in an opening section of this report, there were in general two ways of measuring the Russian achievement

of the students: paper-and-pencil tests, and tape recordings. In the first year of the Russian classes the paper-and-pencil tests contained two scores or sections, dictation and translation. Two scores were also obtained from the tape-recording tests given to these students. The performances of the students were correlated across these four tests with the resulting matrix of intercorrelations[28] shown in Table 3.

TABLE 3

Intercorrelation of First-Year Russian Tests

	Dictation	*Translation*	*Tape 1*
Dictation			
Translation	.89		
Tape 1	.72	.64	
Tape 2	.71	.74	.60

From such high intercorrelations, it is obvious that these tests (both paper and pencil and tape recordings) were getting at essentially the same performance. Students who scored high on one of these tests tended to score high on the others.

During the second year of the Russian course a greater variety of scores were obtained on the two main types of tests. There were four scores from the paper-and-pencil tests and three scores from the tape-recording tests. The names of these scores and their intercorrelations are shown in Table 4.

TABLE 4

Intercorrelation of Second-Year Russian Tests

	Dictation	*Translation*	*Objective*	*Grammar*	*Tape, r.*	*Tape, p.*
Dictation						
Translation	.92					
Objective	.72	.75				
Grammar	.82	.86	.67			
Tape, reading	.74	.72	.47	.64		
Tape, pronounciation	.65	.64	.41	.51	.67	
Tape, understanding and grammar	.71	.74	.58	.66	.63	.62

Again, it appears that these several tests are highly enough intercorrelated that one can conclude that these tests measure essentially the same underlying performance in Russian. This is particularly true for the dictation and translation portion of the paper-and-pencil tests compared to the tape-recording tests.

[28] Appendix B5.

Since the method of testing using a tape recorder required lengthy individual interviews with each student, and since these scores correlated so highly with the paper-and-pencil tests which could be given to a group, it was decided for the third year to eliminate this procedure. The paper-and-pencil tests given across the third year contained four parts. These parts, their correlations with each other, and their correlations with the total score obtained by summing all parts are presented in Table 5.

TABLE 5

Intercorrelation of Third-Year Russian Tests

	Dictation	*Translation*	*Completion*	*Comprehension*
Dictation				
Translation	.89			
Completion	.65	.75		
Comprehension	.74	.83	.71	
Total	.94	.98	.82	.86

On the well-founded hunch that these various subtests of Russian ability were all essentially measuring the same underlying Russian achievement, it was hypothesized that a factor analysis which included the various scores on the Russian tests would yield one single factor of Russian achievement. Hence, a factor analysis[24] was performed on intercorrelations resulting from the second-year data and, separately, another factor analysis was performed on the scores from the third-year data.[25] In addition to the various Russian scores, certain other variables were also included in the matrix of intercorrelations for the factor analysis. Of particular interest at this stage in the report was the inclusion of variables which were thought to be potential predictors of Russian success. For example, we included each student's IQ, his scores on the seven parts of the Metropolitan Achievement Test, and the measures of his attitude toward the Russian class itself. It is recognized that these attitude scores could not be obtained before a student's enrollment in Russian and are, therefore, not really predictors in the sense of the IQ and achievement test scores. Nevertheless, one year's attitude might be used to predict the next year's success.

Table 6 lists the various mental abilities, the two attitude tests and the various Russian achievement tests in the left-hand column. Column two shows the average correlation coefficient between each of the mental abilities and those Russian tests (indicated by X) given in the first year. The third and fourth

[24] *Ibid.*

[25] The two complete factor matrices are shown in Appendix C.

TABLE 6
Prediction of Russian

	First-year validity correlation	*Second-year factor loading, 6-factor rotation*	*Third-year factor loading, 11-factor rotation*
Mental Ability			
I.Q.	--	.46	.36
Word knowledge	.39	.36	.29
Word discrimination	.42	.47	.40
Reading	.32	.17	.30
Spelling	.52	.61	.49
Language	.42	.51	.47
Arithmetic computation	.27	.25	.43
Arithmetic reasoning	.30	.26	.43
Attitude toward Russian			
Pupil Self-Report	--	--	.36
Parent Rating	--	.61	.32
Russian Achievement			
Dictation	X	.91	.88
Translation	X	.93	.93
Objective completion	--	.76	.79
Grammar	--	.87	--
Comprehension	--	--	.89
Total	--	--	.96
Tape, reading	X	.81	--
Tape, pronunciation	X	.74	--
Tape, understanding and grammar	--	.81	--

columns show the factor loadings on the Russian achievement factor in the factor analysis of the second-year and third-year results respectively.

The numbers expressed in the last two columns are factor loadings which are not really correlation coefficients such as those shown for the first year, but are similar in meaning. These factor loadings are more like the correlation between each of the variables and a perfect measure of this factor, whatever it is. It is fairly obvious that the perfect measure of these last two columns must be achievement in Russian, since the Russian tests load so highly (up to .96) on this factor. All Russian tests for the second year fell out on a single factor shown as column three in Table 6. All the Russian tests given the third year loaded on a single factor shown as column four.

We have proven, therefore, that it is sufficient in this study simply to speak of predicting Russian achievement in general. It is pointless to investigate the

possibilities of separate predictors for different types of Russian performance, since there seems to be only one underlying Russian ability as evidenced by these students in their various Russian tests. Looking at the mental abilities as predictors, it is interesting to note that the Spelling section of the Metropolitan Achievement Test was the highest predictor in each of the three years. This finding is probably a function of the method of teaching the Russian course. The language instructors both placed heavy emphasis upon the Russian alphabet and its use in composing words, an analytical approach very much like that of learning to spell in any language.

It is obvious from such substantial correlations that a reasonably good prediction could be made ahead of time for the possibility of a student's succeeding in the study of the Russian language. It is also interesting to note that both measures of attitude toward the Russian course, the Pupil Self-Report and the Parent Rating, have loadings on the same factor as the Russian scores in the third year.

This gives evidence of an attitudinal or motivational aspect to the learning of Russian. Thus, not only is knowledge of a student's mental ability important in determining who should take Russian, but also some indication of his attitude toward such a course is relevant. Although our attitude measurement was taken after the course had begun, future studies could either include administering a precourse attitude scale toward the study of a foreign language or administering an attitude scale such as ours during the student's first term in Russian to help predict his capacity to stay in the course in later years.

More specifically, in an attempt to predict success in the Russian language let us look at the results of a multiple regression[36] study. Using as a criterion the grades in Russian of 124 students in their *third* year of classes in the language, sixteen predictors were chosen. These predictors were the students' scores on the IQ test, the seven parts of the Metropolitan Achievement Test, the four parts of the *second* year's classroom achievement, the education of each parent, and two measures of attitude toward the Russian class taken during the *second* year. The multiple correlation between the best combination of the 16 predictors and the third-year Russian grades was .689.[37] This is a substantial degree of correlation, but requires sixteen predictors. Reducing the battery of predictors from 16 to three, viz., the Pupil Self-Report attitude, and the Spelling and Language tests from the Metropolitan Achievement Test, only reduces the multiple correlation to .63, which is still 91 per cent as good as the coefficient based on all the predictors. These three tests are the best of the sixteen

[36] Appendix B5.

[37] Appendix D lists the predictors and their intercorrelations.

predictors. We had already noted that Spelling was consistently the highest correlate with any year's Russian grades. For this particular sample it correlated .44 with Russian achievement. The Language section of the Metropolitan test also had a correlation of .44 with Russian. However, the previous year's Pupil Self-Report was the best single predictor of Russian performance with a correlation of .50. Of equal importance for prediction was the fact that Pupil Self-Report was fairly independent of the other two good predictors, Spelling and Language, showing a correlation of .22 and .27 with each respectively. Hence in these three predictors there are two relatively separate sources of individual difference: the student's motivation or attitude, from Pupil Self-Report, and the student's ability, from the Spelling and Language achievement tests. Of these latter two the Spelling test is probably somewhat unique to this project. Here ability to spell in English may be related to the way Russian was taught in this project, while the Language test might have more general applicability to predicting the learning of Russian taught in other ways.

The years of schooling of each parent were included in the above list of sixteen potential predictors on the theory that some such index of the student's socio-economic background might relate to his performance in Russian. The multiple correlation procedure used above certainly rejected this hypothesis. This theory was also rejected by the results of the factor analyses. The parents' education consistently appeared as a single factor which had no relationship to the achievement in Russian.

The possibility also had to be considered that a student's performance in Russian could be predicted from his previous grades or achievement in regular classwork. Therefore the student's achievement in Science, Social Studies, Arithmetic and Spelling during the second year of the project was included in the above list for predicting third-year achievement in Russian. However, these too failed to compete with Pupil Self-Report and the two parts of the Metropolitan Test as predictors of Russian. Again the factor analyses support the conclusion that previous classwork achievement is a poor predictor of Russian achievement.

Hypotheses I and II were related to the proposition that *more enrollment* in the Russian course would affect a student's performance in his regular classwork and in his socio-emotional behavior. The second part of Hypothesis III deals with the possible effect of *relative success* of those students in learning the Russian language. It states, "differences in success of Russian will not interact with Hypotheses I and II." In other words, we expected the Russian program to have an impact, but we did not expect relative performance in learning Russian to have a similar impact. The student performances for consideration in this

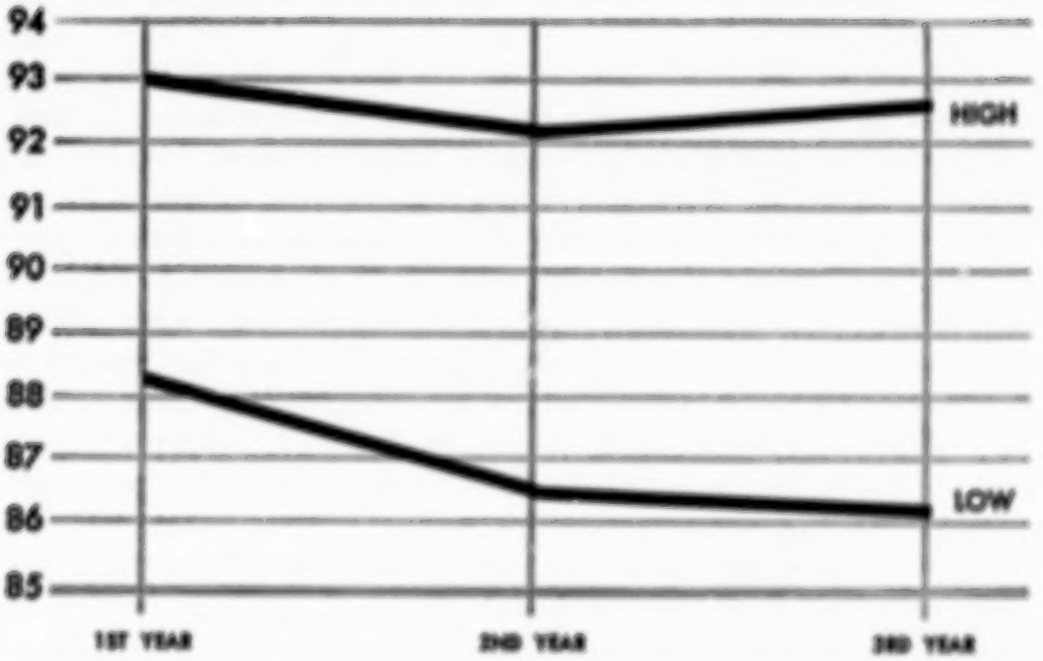
portion of the hypothesis are again only those of superior students in the fourth and fifth grades and those of average students who enrolled in Russian. This does not concern the students who were not enrolled in Russian, but were used as a control.

Originally it was intended to test this hypothesis by the use of analysis of covariance using success in Russian (as measured by test grades) as the correlating or covariant variable for adjusting the analysis of variance used in testing Hypotheses I and II. However, collecting this additional variable of Russian scores across the three years for each of the students added a final sampling burden that our statistical groupings simply could not withstand. It was too difficult to get a complete set of data on both the dependent variable and the correlated variable in each of the groups. The statistical groupings became too small in size for any meaningful comparison. Fortunately, alternate methods proved fruitful in testing this hypothesis. In an earlier treatment of the results of the first year, we separated all the Russian students into two groups: those who had high scores and those who had low scores in Russian at the end of the year. These two groups were then compared on their first year's performance in each of the classroom subjects, Science, Social Studies, Arithmetic, Spelling, and on each of the three socio-emotional dimensions, Self-Initiated Drive, Leadership, and Emotional Control. There was a persistent tendency for the "high-Russian performers" to have better scores in these variables than the "low-Russian performers," but this difference was not statistically significant. Therefore, the second part of Hypothesis III appeared to be supported by the first-year data; that is, differences in the success in Russian were not interacting with Hypotheses I and II. After the next two years' data were completed, the high- and low-performing-Russian students were compared across all three years on each of the seven variables stipulated in Hypotheses I and II. Now the differences were strikingly significant.[9] One chart is deemed to be sufficient to illustrate this effect. Figure 23 shows the scores achieved in Science across the three years by those who obtained high scores and those who obtained low scores in Russian. The remaining six plots show virtually the same effect.

These results would appear strongly to reject this hypothesis, suggesting that those who did well in Russian were indeed doing better in their other regular classwork and behavior. However, these results could be confounded with the student's basic learning ability. It is reasonable to assume that those who get high scores in Russian are also higher in IQ and basic-achievement level; hence, they should have obtained higher grades in their four subject mat-

[9] Probability < .001, Appendix H.

FIGURE 23



Achievement in Science by Superior Students with High and Low Russian Scores

ters and possibly were rated higher in socio-emotional behavior because of the "halo" described in a previous section. In fact, when the students who were placed in the high-scoring-Russian group were compared with those in the low-scoring-Russian group for IQ and total score on the Metropolitan Achievement Test, the differences were very significant with the high-Russian group surpassing the others in IQ[59] and Metropolitan scores.[60] This suggests the need for yet another type of covariance, a controlling of basic IQ and achievement. The most efficient procedure for producing this effect is the use of partial correlation coefficients. Therefore, taking the third-year data as illustrative of all the years, a table of intercorrelation coefficients was computed between each of the following variables: (1) the dependent variable of classroom performance (each of the seven variables in turn from Hypotheses I and II), (2) the scores in Russian for the year, (3) IQ, and (4) total score in the Metropolitan Achievement Test.

[59] Probability $< .01$, Appendix B4.
[60] Probability $< .001$, *ibid.*

Taking scores in Science as an illustrative dependent variable, the correlation was computed between scores in Science and achievement in Russian with IQ and Metropolitan Achievement "partialed out."

The results of these partial correlations indicated that this second part of Hypothesis III was supported in two instances and rejected in five. Specifically, achievement in Russian had no effect on scores in Science (Hypothesis I) or Leadership (Hypothesis II), when IQ and Metropolitan Achievement were "partialed out." However, performance in Russian correlated with scores in Social Studies, Arithmetic, and Spelling (Hypothesis I) and also correlated with ratings in Self-Initiated Drive and Emotional Control (Hypothesis II). In these latter five, the partial correlation between success in Russian and in each of the variables ranged only from .19 to .29 which, though not impressively high, are nonetheless statistically[*] significant from zero correlation.

On the same third-year data an analysis of covariance was computed which dealt with the effect of Russian success on the dependent variables of Hypotheses I and II but did not take into account differences in IQ and achievement. This analysis had no effect on the variables and therefore would have supported this second part of Hypothesis III. It should be obvious that the method of partial correlation more efficiently handles all the variables and offers better evidence relative to this part of Hypothesis III.

We could conclude, then, that success in Russian did interact with variables in Hypotheses I and II, with the exception of Science and Leadership.

HYPOTHESIS IV

The superior students will show more interest in this class than will the average students. Interest in the Russian class was measured two ways each year,[**] by Pupil Self-Report and by Parent Rating of student interest. The maximum-entry plot for both of these measurements is shown for the three years in Figure 24.

The most obvious thing about these plots is that the interest dropped off after the first year. This drop was particularly striking from the first to the second year.

A factor which may have been related to the change was the mode of television production. First-year production tended to be simple — while many visual aids were used, the style was highly formal. The second year a more re-

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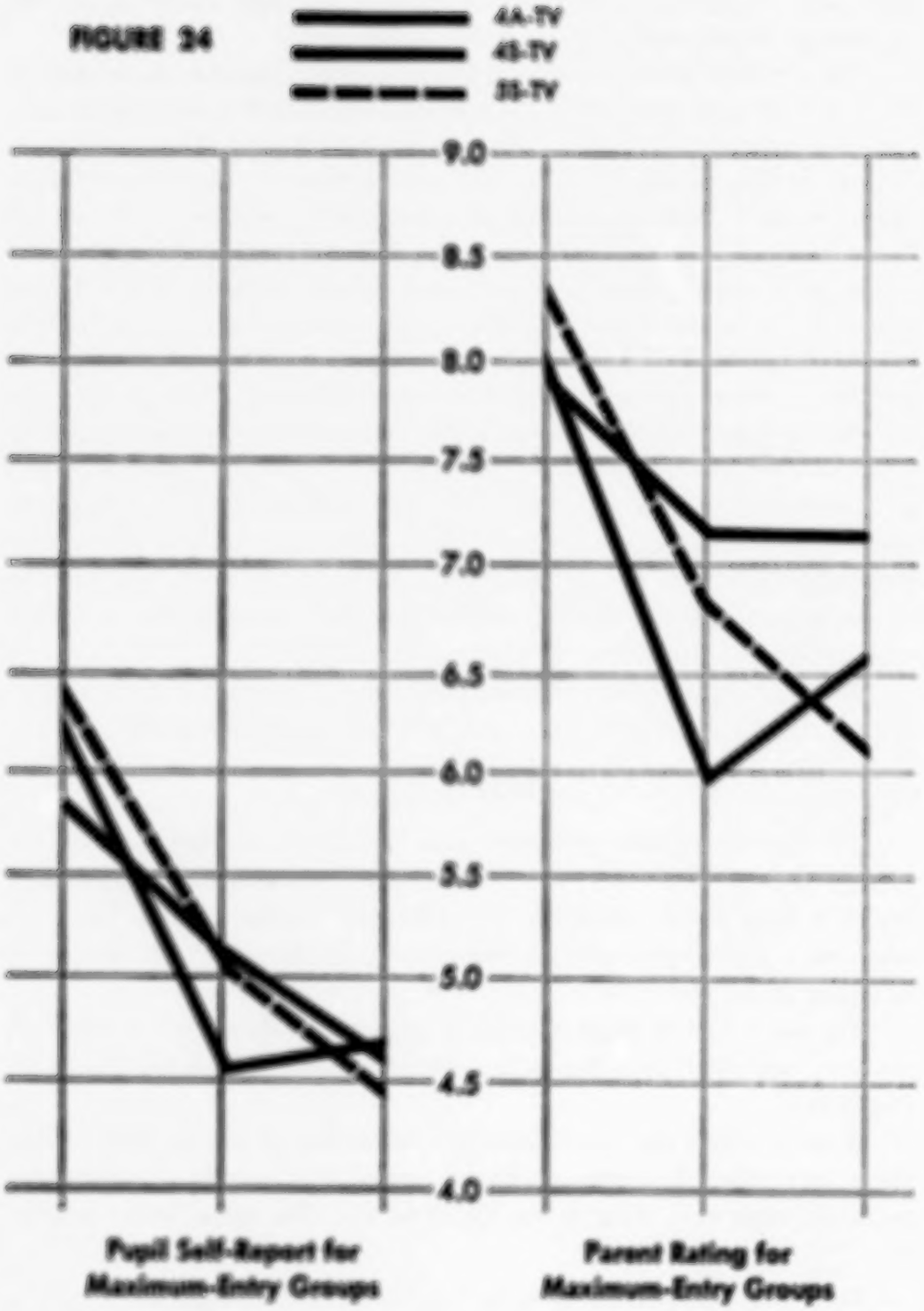
[*] Probability $< .05$.

[**] Film ratings (see section on The Measuring Instruments) were taken as an additional index of student interest but were discontinued after the first year because they failed to discriminate across time or between groups, besides being expensive in time and money.

FIGURE 24


4A-TV
4S-TV
3S-TV
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
Pupil Self-Report for Maximum-Entry Groups
Parent Rating for Maximum-Entry Groups

laxed style of presentation prevailed. By the third year, an imaginative setting with different elements was devised, and the instructor was less formal.

The decrease in interest is evident in all three groups: superior students enrolled in Russian (both the 4S-TV and 5S-TV groups), and the average students enrolled in Russian. The apparent differences among these three groups at each year's point on the graph of the Pupil Self-Report are not significant differences. Thus, as measured by Pupil Self-Report these three groups showed about the same amount of interest among themselves each year. However, when we examine the separate analyses done at each of the three points for the Parent Rating the superior students had a significantly[33] higher interest than the average students in the first year's measurement. This difference in interest was also exhibited in the second-year analysis, with the additional finding that the 4S-TV students had a yet higher[34] interest than the 5S-TV students, while both these superior groups showed significantly[35] greater interest than the 4A-TV students. The third-year analysis shows no such significant differences among these three groups. These annual analyses of variance show significant differences that may not be reflected in the maximum-entry figures of Figure 24. The annual analyses were based on equal-sized statistical groupings while the maximum-entry plots shown here incorporate every available score.

Hypothesis IV is not supported when measured in terms of the Pupil Self-Report. It is supported, however, for the first and second years when measured by the Parent Rating. In this latter case, the superior students did show more interest in the class than the average students. The fact that these two measures of pupil interest did not show identical results at each year's point suggests that they were not in complete agreement in measuring this underlying interest. A correlation coefficient computed between these two measures on the third-year data indicates a relationship of .58, and these two measures tend to stay together on the same factors in the factor analysis.

At this point, an observation is in order concerning those superior students who took the Russian from "live" instructors instead of by television. The bulk of our discussion concerning this Live group will be reserved for Hypothesis VI; however, the interest in the Russian class was also measured for the Live group and can be compared with the interest discussed above for the students participating via television. On both measures of interest this group was higher than the TV groups in the first year, but showed a very similar decrease by the time the program was completed at the end of the third year. However, their drop in

[33] Probability $<$ .05, Appendix B4.
[34] Probability $<$ .05, *ibid.*
[35] Probability $<$ .05, *ibid.*

interest from the first to the second year was not as marked as the drop shown in Figure 24.

Additional information is to be gained, apart from this specific hypothesis, from the separate items in the Pupil Self-Report as it was completed twice each year by the students. For example, in the opening year the interest of all students in general dropped from midterm to final. The students also indicated they wanted a shorter class hour and a slower presentation by the instructor. However, during the second year their interest held steady from the midterm rating until the final; nor did they ask for the program to change in length or pace. Apparently the striking drop in interest shown in Figure 24 from the first year to the second was leveled off during the second year, and the drop from the second to the third year was not so great.

In the third and final year their interest from midterm to the final dropped again and they still wanted the instructor to move more slowly in covering the material; however, they did not desire a shorter instruction period. It should be noted that in this third year the Russian telecast had been reduced from thirty minutes to twenty minutes. Apparently this was more in keeping with the students' desires.

It seemed to us that the family background of the student was another facet of pupil interest. During the second year, therefore, we requested that the parents indicate their occupation on a questionnaire. These occupations were classified into nine categories and the students were grouped according to their parents' occupations (i.e., nine groups). These groups were compared on their mean interest in the Russian class, but no differences among the groups were obtained. This lack of relationship between pupil interest in Russian and parents' occupations was true for both the Pupil Self-Report and the Parent Rating. As another index of family background, the number of years of schooling completed by both the father and mother of each student was obtained. The education of the parents was not significantly correlated with the two measures of pupil interest in Russian. Thus, none of these indices of family background related to this interest.

These measures of interest, particularly the pupil's own self-report, can be viewed as an intervening variable between the stimulus of the Russian program and the students' response in terms of performance in the regular classroom. That is, the question can be raised, "Did the students' interest in Russian affect their performance in their other classwork?" To answer this question and at the same time to control the effects of differences in ability, two matched subgroups of superior students were prepared. One group consisted of those students maintaining a high interest in Russian for the three years as measured

by the Pupil Self-Report, and another group consisted of those students showing a low interest. However, these groups were matched person-to-person on IQ and the Metropolitan Achievement Test. Thus were formed two groups of students differing considerably in their interest in the program yet alike in their basic abilities. When the performance of these two groups is compared across three years on each of the seven dependent variables from Hypotheses I and II some striking differences are found. In every instance the students with the high attitude toward Russian performed better in his classroom than did the students with low interest in Russian. This difference in performance was very significant[36] on the variable of Arithmetic, quite significant[37] for the variables of Science, Social Studies, Self-Initiated Drive and Leadership, and significant[38] for the variables of Spelling and Emotional Control.

In summarizing Hypothesis IV, it can be stated that on at least one measure the superior students did show more interest in this Russian class than the average students, especially for the first two years. Of equal importance, however, is the somewhat unexpected finding that, within the superior-student group, those who enjoyed the Russian course more were those who did better in their other classwork. Again we see the importance of this variable called motivation, interest, or attitude. Enrollment in the Russian class had its effect as noted in Hypotheses I and II but doing well in the course (Hypothesis III) and liking it (Hypothesis IV) were also related to their other classroom performances.

HYPOTHESIS V

The extended school day will not lead to more problems than it solves. The observations to be made on this hypothesis are of a subjective nature, depending mainly upon experience and anecdotes. No inferential tests of significance will be reported since we are making no attempts to generalize beyond the samples of students involved in this school district.

The systematic data collected for this hypothesis came primarily from the responses of the students' parents annually on a questionnaire sent to their homes. The parents were asked to indicate on a check list any problems that had arisen at home because of their child's taking the Russian course. In interviews with parents during the first year, several such problems or potential problems had arisen during the conversation; the check list on the questionnaire was composed of these problems. Accompanying this list was a question which asked, "How often has the Russian course, by being after school, interfered

[36] Probability < .001, Appendix B3.
[37] Probability < .01, *ibid.*
[38] Probability < .05, *ibid.*

with your child's . . ." The list of potential problems followed this question and provided a space for the parents to indicate how often this had been a problem for their child. The list, as shown in Table 7, indicates the order of the frequency of problems according to the first year's response.

The table below also shows the relative position of these problems for each of the three years. Note that interference with the pupil's after-school play remains the most frequently mentioned problem for the three years; however, this interference was not considered a problem by a majority of the parents. It was during the second year that this play problem was most often indicated, yet 58 per cent of the parents said this was *never* a problem, 13 per cent said it was *seldom* a problem and the other 29 per cent checked one of the remaining categories: occasionally, often, or always. At the other extreme was the interference with the student's evening meal which received its highest "vote" during the third year and then it was mentioned by only 17 per cent of the parents.

In Table 7 are listed additional trends, but the problem of play still was of the greatest consequence. The student's homework in his other classes was a third-order problem throughout the three years. Interference with church activities and evening meals maintain their relative position. (In this community the "majority" church, the Church of Jesus Christ of Latter-day Saints, maintains an active after-school program for children of this age.) The problem of rest became less important as the students grew older and surprisingly, the problem of chores or home duties also became less — an interesting reflection of our modern way of life. One might have expected the chores and home duties of these students to become more demanding as they grew in responsibility and hence more of a potential problem with their after-school Russian class. It was the family visits and outings, instead, that became more of a problem, as did

TABLE 7

Problem Check List of After-School Activity

Activity	*First-year ranking*	*Second-year ranking*	*Third-year ranking*
Play	1	1	2
Chores or home duties	2	5	5
Other homework	3	3	3
Other lessons (music, dance, etc.)	4	2	1
Church activities	5	6	6
Family visits and outings	6	4	4
Rest	7	8	9
Transportation home from school	8	7	7
Evening meal	9	9	8

their other lessons: music, dance, etc. The latter increase is an expected function of their maturing interests.

Of particular interest is the finding that, with two minor exceptions, there is no difference in the magnitude of these problems for the average students compared with the superior students. One might have expected a greater interference in homework for the average student, but this was not the case and the exceptions are rather understandable. As previously noted, some of the superior students began this program in their fifth year, hence their third year in the program found them in junior high school which caused a transportation problem for some of these students. However, while their transportation became more their homework became less of a problem. Thus, even their junior high school homework did not bother these students who remained in the Russian program. The students who did not remain will be the subject of a discussion in a later section.

It is our opinion that Hypothesis V was supported. Some problems did arise and some were solved. However, the problems discussed above were of no concern to a large majority of the parents of the pupils enrolled in the Russian course.

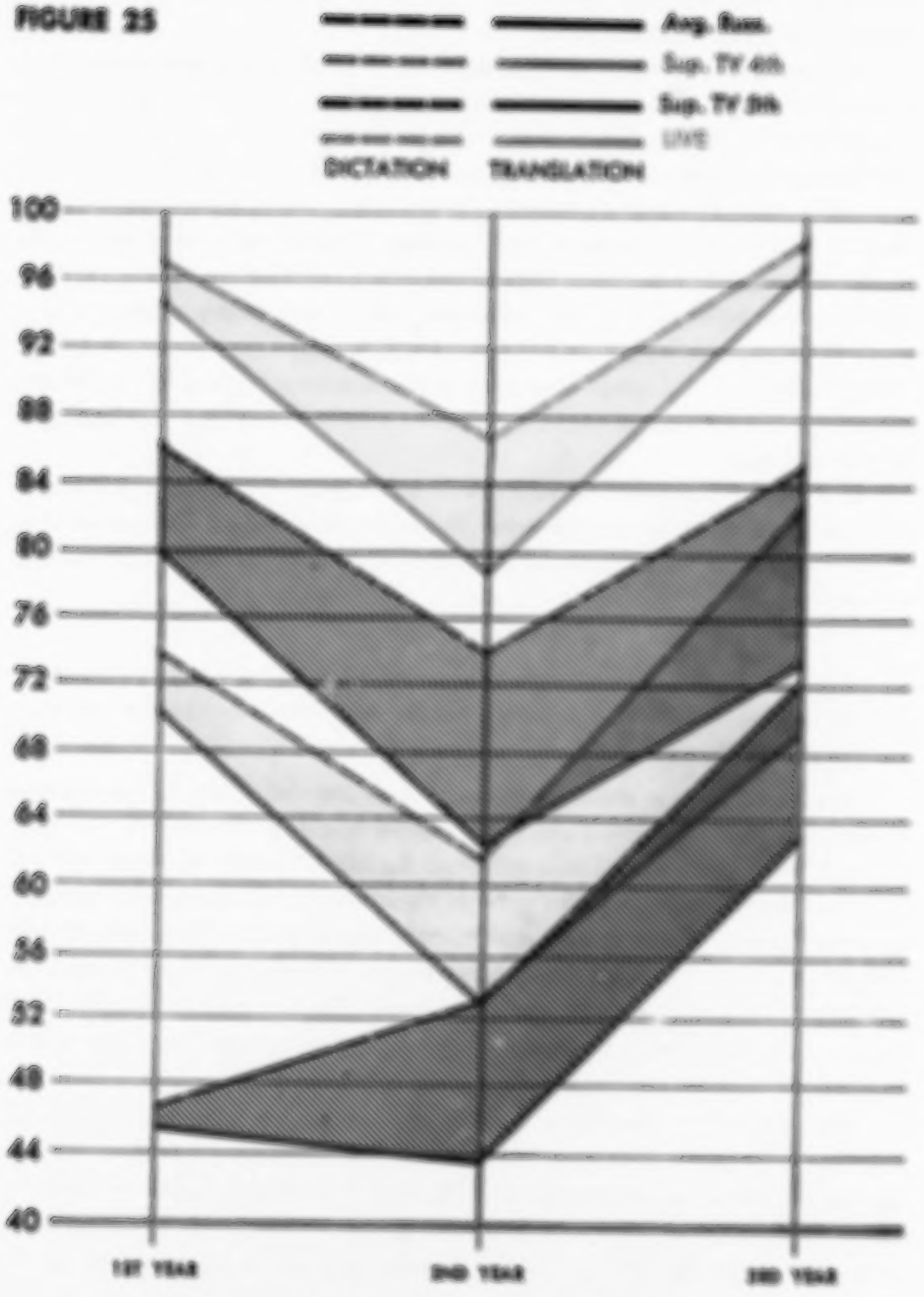
HYPOTHESIS VI

The learning of Russian by those students taking the TV course will not be inferior to those who take it directly from the instructor when learning is measured by their ability to read, write and speak Russian.

This hypothesis is mainly concerned with the difference in instructional procedures; that is, it compares the result of teaching Russian via television versus a "live" instructor. Those who took the instruction by television will still be considered as three different groups: those superior students who began in the fourth grade, those superior students who began in the fifth grade, and the average students. The Live group is composed of those students who took the instruction from either of the Russian teachers. The first part of this discussion will be concerned with a comparison of these four groups, the three which learned via television and the one which had the "live" instructors.

The dependent variable for making this comparison is performance in the Russian language. It has already been demonstrated under Hypothesis III that the various forms of measurement of Russian were highly intercorrelated for each year's grade. In other words, according to our finding the "ability to read, write, and speak Russian" is a unitary ability that can be measured by any of these tests. Further, the several types of Russian tests varied from year to year during the three years of the project. For example, there were no tape-recording

FIGURE 23



Achievement in Russian: Translation and Dictation

tests given the third year. However, there were two types of tests that were common to all years: a translation test, measuring an ability to translate printed English and Russian sentences; and a dictation test, measuring the ability to write Russian from verbal dictation. The performance of the four groups on these two tests in the three-year period is shown in Figure 25.

An inspection of this figure indicates several things. There is a persistant order of performance, with the Live group performing best and followed in order by the 5S-TV, the 4S-TV, and the 4A-TV.

Further, it will be noted that there is generally a drop in performance in the second year on both tests for all except the average group. Figure 25 is not a maximum-entry plot, such as was used in prior hypotheses, but instead has been taken from the separate results of each year's testing.

Analysis of the first year's data indicates that the Live group achieved significantly[40] higher scores on both the translation and the dictation scores than did the other three groups. Also the 5S-TV group exceeded[41] the performance of the 4S-TV group, while the 4S-TV students out-performed[42] the average students. In the second year the Russian scores for the Live group again were significantly[43] higher than the other three and the 5S-TV scores were better[44] than the 4S-TV. However, this time the average students were not significantly less than the 4S-TV students. Finally, in the third year the Live group was again significantly[45] better than the other three on both tests while the 5S-TV group was no longer exceeding the 4S-TV on either test. The average group fell significantly[46] below the 4S-TV on the dictation test, but again held their own with these students on the translation test.

In general, Hypothesis VI was not supported. The learning of Russian by those students taking the TV course was inferior to those who took it directly from the instructor. However, within the groups taking the course by television, the 5S-TV students (who were one year older) tended to learn more than the 4S-TV students. And, somewhat to our surprise, the average students attained a performance not statistically different from the 4S-TV students in several instances. As noted in the preceding hypotheses, the average students were apparently challenged by this Russian course and, as seen in the present

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[40] Probability < .001, Appendix B4.
[41] Probability < .001, *ibid.*
[42] Probability < .001, *ibid.*
[43] Probability < .001, *ibid.*
[44] Probability < .01, *ibid.*
[45] Probability < .001, *ibid.*
[46] Probability < .01, *ibid.*

results, met this challenge. Thus, this televised instruction produced some results which were positive, but not expected.

Further evidence of the efficiency of televised instruction in Russian can be seen in an examination of the several different TV classrooms. If, instead of grouping these television students in terms of superior fourth, superior fifth, and average, we instead replace them in their actual classroom groupings where the instruction was received, a wide range of Russian achievement can be observed. For example, on a Russian test given during the second year, one television class achieved only a 35-per-cent correct score on the examination while the best-performing class obtained a score average of 74 per cent. This latter class was a heterogeneous mixture of both superior and average students. The mean grade on this test for just the superior group was 88 per cent. This exceeds the 81-per-cent-correct score achieved by the Live group on this examination. On another test given the same year, this group of superior students in a television class equaled the 88 per cent achieved by the Live students. Although in general the students receiving their Russian from instructors evidenced a better learning performance than those receiving instruction by television, nevertheless, there were certain classes where the superior students did as well as or better than their superior counterparts in the "live" situation.

How can we account for this broad range of Russian achievement among the various television classes? Certainly one contributing factor was the behavior of the teacher who monitored this television class. For example, in the school cited above where the superior students were taking the course by television and equaling the performance of their live counterparts, the teacher made an effort to equip herself for this assignment by taking special classes.

Initially these teachers who stayed with the students while the televised program was on the air were instructed merely to monitor the set and see that the students worked on their assignments in the follow-up period. It became obvious early in this project that these teachers were responding differentially to this instruction. Therefore, during the latter part of the project observers from the school district were asked to visit these classrooms periodically to note what each teacher was doing. From a subjective analysis of these observers' reports it is possible to describe the kind of teacher behavior that seemed to produce either better or poorer learning of Russian. In those television classrooms where the students were performing well, it was found that the teacher engaged in such activities as dramatization in Russian, singing songs in Russian, using Russian poems and other vocabulary-building devices, and utilizing tape recordings from the televised portion of the class. In those television classrooms where the Russian performance was only fair, the teacher used many visual

aids. Finally in those rooms where the student learning was poor, the reports noted that the teacher was not only inadequate, but admitted it. The teachers in the latter category did not attempt to learn the language and added no ideas to the class. Whether or not the pupils were active in participating during the television program and in the follow-up period seemed to be irrelevant to their learning. In general we concluded that those teachers who were innovators, who used their imagination to bring in additional relevant material, were the ones whose classes best utilized this television instruction.

To give quantitative support to the above conclusion, we prepared a verbal description of each teacher's performance based on the comments of our observers. The teachers were then rated by a group of judges who had never been in the classroom and did not know the level of achievement attained by the students under the teachers. The ratings of the teachers' excellence correlated .52 with the mean grades received by their students in the Russian language. Thus, the teachers' performance accounts for a considerable portion of the differences in success of the television instruction in this language.

ADDITIONAL RESULTS

The Live Students. The three years' behavior of the Live group of superior students was generally omitted from the foregoing discussion of results until the report on Hypothesis VI was given. One exception to this omission was in the discussion of Hypothesis IV where the interest pattern of these Live students was reported. It was noted that they generally displayed a greater interest in the Russian course every year than did those students receiving the course via television. However, the Live group interest was also dropping from year-to-year as was that of the television classes.

When examining the measurements of regular classroom behavior that were taken for Hypotheses I and II, one finds that, during the three years, the Live students performed at the same level as the other superior students in television classes. There is generally no statistical difference between the three-year profiles of these live students versus the television superior students in the socio-emotional ratings and the areas of academic achievement. One exception to this generalization is in Spelling achievement. The Live group performed significantly poorer in Spelling than the superior television classes in the final two years. Thus the Live group may have liked their method of instruction better and achieved higher grades in Russian than the TV groups, but they did not differ from them in the concurrent classwork in regular school hours.

The Average Students. Although the average students (a fairly small group compared to the superior students) were not the focal point of this study,

their performance during the three-year period is worth further comment. Collectively, the mean IQ of these average students who enrolled in Russian was a nonchance departure above the nationally expected average IQ of 100. Yet their IQ of approximately 106 was far below the mean IQ of over 120 for the majority of the students in Russian.

The opening year of this project was apparently an interesting one for the average students. In their after-school Russian class they appeared to be having difficulty — their average percentage of correctness in Russian tests for that first year was below 50 per cent. Yet in their regular classroom they achieved more than 90 per cent in their classwork, equaling or surpassing the classroom achievement of superior students who were enrolled in Russian with them. In the succeeding years, they moved away from these two extreme positions. They no longer equaled the superior-Russian students in their regular classwork, but they kept on a par with other superior students who were not being exposed to Russian. Further, they improved their Russian grades until, by the end of the third year, they were performing at the same level as the superior fourth grade students in Russian on most examinations.

For a group of average students to perform so well is an unexpected and interesting fact in itself. This result deserves further investigation in future studies. There may be many so-called average students who are ripe for such an extracurricular challenge.

The Drop-outs. In any longitudinal study there will be students who drop from the program. In this study the attrition rate in the Russian groups averaged less than 33 per cent and ranged from 29 per cent for the 5S-TV group to 33 per cent for the 4A-TV and 5S-TV groups. Although, as previously mentioned, the Live group showed higher interest in the Russian class than the TV groups their drop-out rate was 31 per cent, falling within the range established by the TV groups. One obvious reason why pupils withdrew from this program was because their parents moved to a new neighborhood where the school was not included in our project. Such students will be referred to as "movers," while those who withdrew from the Russian class for other reasons will be referred to as "nonmovers."

The average students who dropped from the Russian program had an IQ that was equivalent to those average students who remained in the Russian program. However, those superior students who withdrew had a mean IQ somewhat below that of those superior students who remained with the course. When these superior students who dropped out are separated into the two groups of movers and nonmovers we find that it was the nonmovers who had the slightly inferior IQ. The nonmovers also tended to receive slightly lower

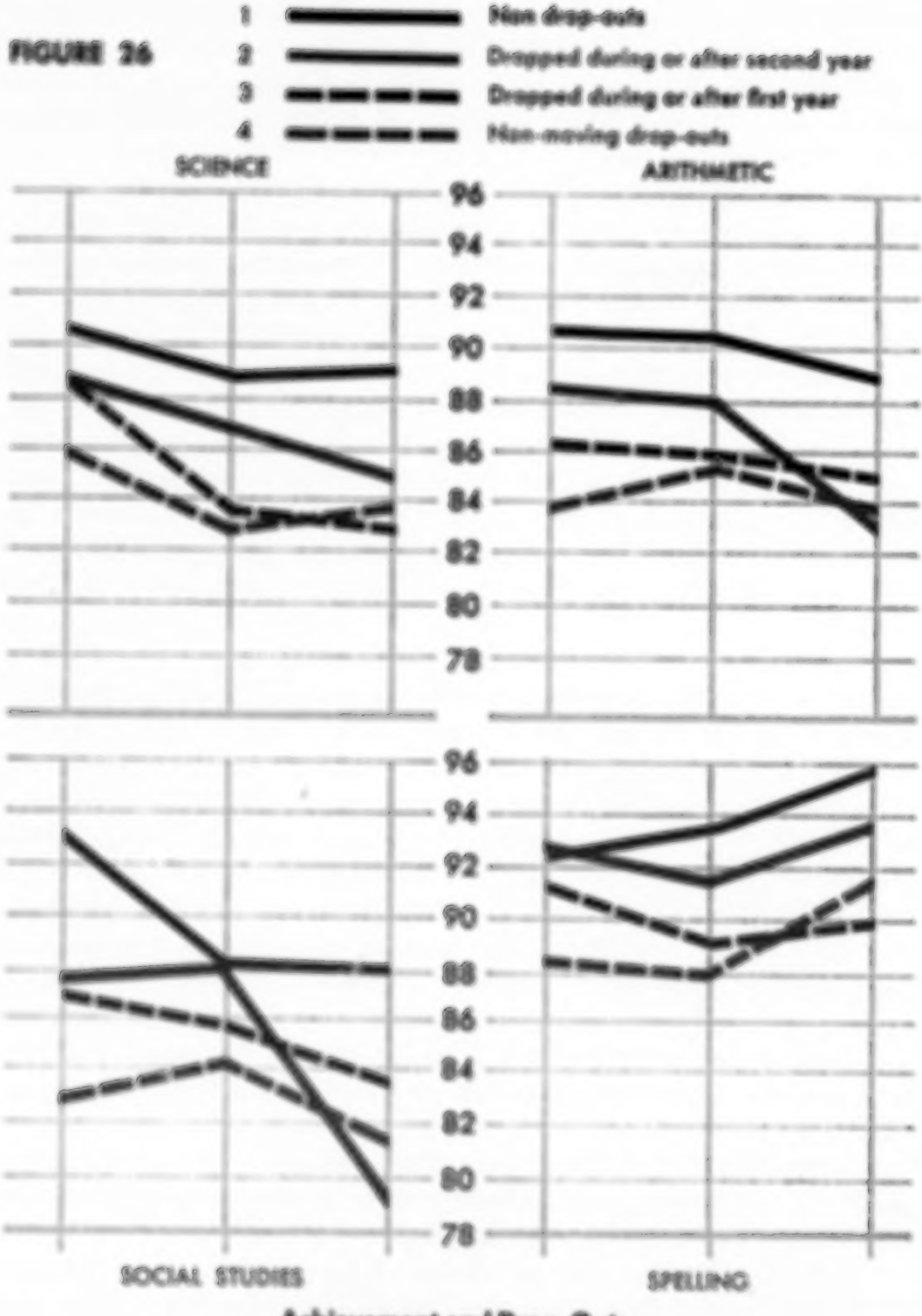
scores on the Metropolitan Achievement Test, the Pupil Self-Report of attitude toward the Russian course, and the Parent Rating. In general, one can conclude that those students who dropped out of the Russian program, especially the superior students whose parents did not move, were characterized by less ability and less interest in the Russian course than those who remained with the program. This is to be expected.

Did dropping out of the Russian class bear any relationship to the students' performance in regular classwork? The answer is a qualified "yes." The specific answers to these questions were found by forming four groups of superior students: (1) those students who remained with the program in Russian for the full three years; (2) those who dropped out sometime during, or at the end of, the second year; (3) those who dropped out sometime during the first year; (4) an exclusive group of nonmovers who dropped out sometime during the three years. Groups 2 and 3 were a composite of both movers and nonmovers on whom we had data from their classroom performance for the three years. Group 4 was compiled as a purer measure of the results from nonmovers for comparison to Groups 2 and 3. Figure 26 shows the performance of each of these four groups across the three years on the classroom variables from Hypothesis I.

These plots were not treated for significant differences, but are shown merely for the readers' inspection. Note that, in general, the scores of these four groups during the first year of any variable are in a rank order. Group 1 has usually the highest performance with Group 4 having the lowest performance. Throughout the three years, the Group 2 drop-outs were moving at a rate parallel to the Group 1 students in Science and Arithmetic until they withdrew from the program, at which time their performance dropped at a faster rate. In Social Studies, Group 2 was showing some improvement until they withdrew, then their loss was appreciable. This suggests that the Group-2 people were handicapped in these courses after they discontinued Russian. However, in Spelling they reversed the trend and showed an improvement at this point. It would appear that Group 3 made its greatest decrease in Science when it withdrew from the first-year's Russian class. In the subjects of Arithmetic and Social Studies, Group 3 more nearly paralleled the decline shown by Group 1. And in Spelling, Group 3 looks generally like Group 2. Typically, as noted above, the nonmovers are at the bottom of the performance level, i.e., those who dropped for reasons other than moving were generally poorer performers.

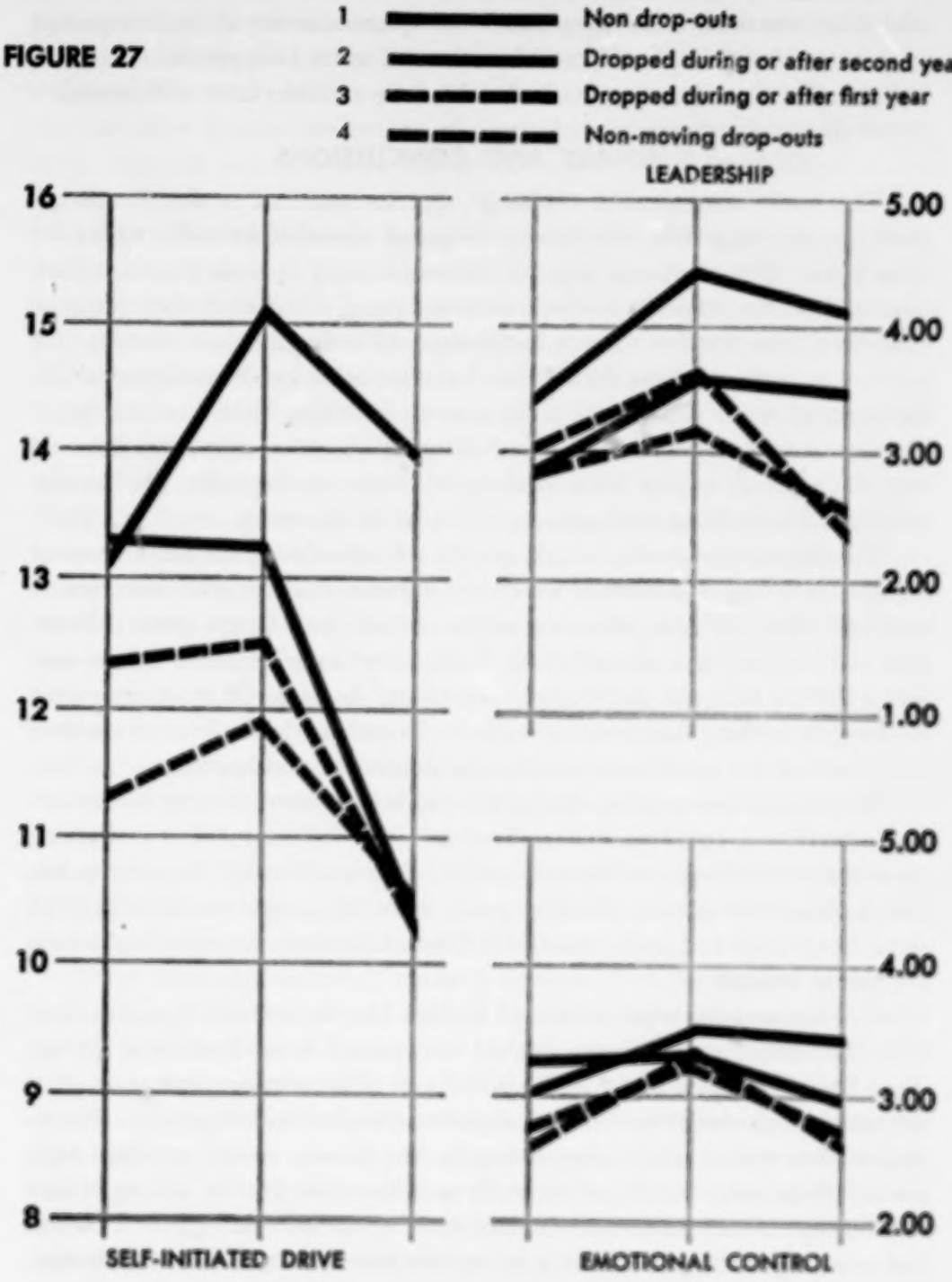
In the area of socio-emotional behavior we have the plots shown in Figure 27. In Self-Initiated Drive the students who dropped out (Groups 2, 3, and 4) failed to show the gain in this drive that was shown by those who remained

FIGURE 26



Achievement and Drop-Outs

FIGURE 27



Socio-Emotional Ratings and Drop-Outs

in the Russian program. Group 2 may have been held down on this variable while they remained in the program. The sequential scores of the four groups on the variables of Leadership and Emotional Control look parallel enough to conclude that there was no special effect on these variables from withdrawal.

SUMMARY AND CONCLUSIONS

This study attempted to challenge superior students in the elementary grades by teaching them the Russian language via television after school for three years. Why challenge superior students? Since Sputnik there has been an uneasy feeling that our students were not being stretched to their limits of intellectual capacity. For an even longer time the feeling has been that superior students in particular have been allowed to coast at an intellectual speed set by the larger group of average and below average students. There has been speculation, and some proof, that this unchallenging moderate speed has not only kept the superior student from reaching his limits academically, but has also contributed to his being a behavioral problem in the classroom.

Did the superior students in the project who enrolled in the Russian course perform at a higher academic level than superior students who were not so enrolled? Yes. Of those who were observed from their fourth grade through their sixth grade, the students taking Russian performed better in Science and Social Studies than did the students not taking Russian. Of those who were observed from their fifth grade through the seventh grade, the Russian students outperformed the non-Russian students in Arithmetic and Spelling.

Did the superior students taking Russian behave better in their homeroom than superior students not taking Russian? Yes. Those enrolled in Russian showed more Self-Initiated Drive over the three years. Further the older group, that is those who were in the fifth grade when the project started, displayed more Leadership and more Emotional Control than similar superior students not taking Russian.

Did the students who enrolled in Russian like the course? If so, did those who liked it best perform better in their homeroom? If was found that the students liked the course better in the initial year than in subsequent years. It is not unusual for the glow of a new experience to dim with repetition. Nevertheless those whose interest and liking for the Russian course remained high for the three years continued to perform better academically and to behave more independently and maturely than those whose interest lagged. This was true even when students differing in interest were equated for scholastic aptitude. Nor was this interest in and attitude toward Russian related to the student's socio-economic background.

In addition to the effect of being enrolled in Russian, did the students who performed best in this extracurricular class also perform better in their homeroom activities than the other Russian students? Yes. Even when equated for scholastic ability the students who did better in Russian also tended to do better than other Russian students in all their observed regular classwork except in the academic area of Science and the behavioral area of Leadership.

Could it have been predicted in advance which students would perform best in the Russian course? Yes. Using two scores from the Metropolitan Achievement Test (Spelling and Language) plus a score representing the student's attitude toward the Russian course, a score in Russian achievement was predicted for each student. These predicted scores correlated very well (.63) with the students' actual scores obtained in the Russian course.

Did conducting the Russian course after the regular school hours interfere with the students' lives? Not seriously. The greatest interference was with the students' play activities, and for three-quarters of the students this was rarely a problem. Other problems listed even less frequently dealt with interference with homework and other lessons such as piano and dancing. After-school transportation, rest periods, and meals were virtually no problem at all.

Were the superior students the only ones who performed better in their homerooms while enrolled in Russian? No. The average students included for comparative purposes also performed better than expected in all aspects, both academically and behaviorally. This was particularly true in the initial year of the project after which the glow dimmed somewhat.

But didn't some students drop out of the Russian course before the three years were completed? Yes. Approximately one-third dropped out for one reason or another. However, this rate of attrition was the same for both the superior and the average students and often the homeroom performance lowered after they dropped the Russian course.

What about the method of teaching Russian? Did the students taking the course via television perform as well in Russian as those who took the course directly from the Russian instructors? Considering all things the answer to the latter question is negative. The students in the "live" classrooms obtained higher scores on the Russian tests than did those in the television classrooms, with few exceptions. There were television classrooms in which the superior students sometimes did as well or better than the superior students taking the course "live." An important factor in the differences in Russian achievement in the various TV classrooms was the teacher who "monitored" the class. The best monitoring teachers were apparently those who could innovate, who could use a variety of techniques for following up the televised instruction.

No attempt was planned or conducted to compare systematically the different methods of teaching Russian via television. A significant distraction during the period of the project was a difference of opinion among elementary school educators about the teaching method of the television instructor. The so-called audio-lingual method of teaching, apparently the current favorite, was not utilized by the instructor. He heavily emphasized learning to read and write. Drills were conducted on pronunciation of words, but conversation was not emphasized. It would be interesting to know how much the method of teaching affected the student's behavior and achievement in other coursework. Taught with Old-World formality and given drills which required mental discipline to say nothing of sizable homework in many lessons, did the Russian students learn better study habits than their peers who may have had a more relaxed type of instruction?

The general pattern of homeroom-achievement scores received by the students in this project displayed a downward trend across the three years. Is this the typical pattern in other elementary schools? Our hypotheses predicted that superior students when challenged would gain more in achievement in their homerooms — our results showed that they lost less instead of gained more.

Did the major challenge come in the after-school, extra-time aspect of the study, or in the teaching method of the instructor? Were the monitoring teachers who, as we have found, played such an important role in the achievement of the Russian students, affected by the television's formal method of instruction? If their teacher's attitude toward the instruction were negative, would the students' attitude be negative and achievement thus curtailed?

These last three paragraphs have raised unanswered questions and there are many more which could be raised. In any investigation of questions such as attempted in this project there are, and will always be, the complications inherent in research with persons enmeshed in on-going activities. The students observed in this study were engaged in their regular schoolwork and their home life. To the schools and families research is secondary; compromises had to be made in the research design. Future studies will face the same problems.

It is significant that the Salt Lake City Schools are planning to continue an after-school program on television for the purpose of providing an extra challenge to students, but the subject matter will be science, and the curriculum will be far less rigidly structured than the Russian course. Tentative plans call for a follow-up study to see how students in an extracurricular science program compare with those in the Russian project.

APPENDICES

APPENDIX A1

Grade each listed pupil on the following basis: "On the average his (her) work is _____% correct." Please use such records as test scores, accuracy and completeness of reports, etc.

Student Name	*Science*	*Social Studies*	*Arithmetic*	*Spelling*

APPENDIX A2

CONFIDENTIAL
For Research Only

PUPIL BEHAVIOR SCALE

Instructions

Attached is a list of statements that have been used by teachers in describing some elementary school students. We would like you to use these statements to describe certain students in your room.

Accompanying this is a stack of cards — one for each child whom we wish you to describe. First take one student card and (using it as a straightedge) place it below statement "A." This statement reads: "Likes holidays." Since this is typical or characteristic of most students, we have taken the liberty of filling in the top space on the card under "A." Notice that this top row is titled "Typical." Next slide the card down below statement "B." This statement reads: "Talks like a university professor." Since this statement is not typical of most students, we have taken the liberty of marking it in the bottom space on the card under "B." This row is titled "Not Typical."

Please use the pencil provided. Be careful not to mark anywhere outside the oblong spaces. Notice how this space is to be filled in. Continue sliding the card down and marking an answer for each statement. You will have to turn the card over and mark it on the back for statements from number 20 on.

Please repeat this procedure for all the cards that were given you that contain the names of students in your room.

This information will be held in strict confidence. It is for research purposes only.

PUPIL BEHAVIOR SCALE

Samples: a. Likes holidays.
b. Talks like a university professor.

1. helps children who are having trouble.
2. does things on own.
3. is the spark for the class.
4. likes both boys and girls.
5. makes suggestions.
6. not sure of self.
7. has better emotional control.
8. has ideas of own.
9. does not plan and organize work.
10. studies hard.
11. works independently.
12. able to cover up feelings.
13. knows when it's just "busy work."
14. does more than required.
15. gives others the benefit of the doubt.
16. needs very little encouragement from teacher.
17. better vocabulary.
18. delegates responsibility.
19. able to control other children.
20. eager to work.
21. gives reports of progress in committees.
22. doesn't give in to the other guy.
23. adjusts better.
24. fills spare time with activities.
25. finds work to do on his (her) own.
26. not curious.
27. good organizer and supervisor of games.
28. thinks of things to do.
29. doesn't think things out.
30. likes to try difficult things.
31. carries through on projects.
32. doesn't wander in thinking.
33. not hard to do things on own.
34. likes to be kept busy.
35. does not wait for you to do it for him (her).
36. does not take responsibility.
37. does harder things.
38. does not get the over-all picture of education.
39. goes to dictionary on his (her) own.

APPENDIX A3

RUSSIAN LANGUAGE TEST NO. 3
ANSWER SHEET FOR TEACHERS

Part A. Translate into Russian using cursive writing.

1. Chalk, pen and pencil

   Мел, перо и карандаш.

2. (Is) this (the) wall? No, this (is the) window.

   Это стена? Нет, это окно.

3. Where (is the) clock? (The) clock (is) on (the) wall.

   Где часы? Часы на стене.

4. Face, hand, nose, head, and hair

   Лицо, рука, нос, голова и волосы.

5. His glasses (are) here? No, they (are) at home.

   Его очки тут? Нет, они дома.

Part B. Translate into English:

1. Картина и часы на стене.

   The picture and the clock are on the wall.

2. Это пол или потолок? Нет, это окно.

   Is this the floor or the ceiling? No, it is a window.

3. Его брат студент? Нет, его брат инженер.

   Is his brother a student? No, his brother is an engineer.

4. Губы, зубы, щёки, пальцы и глаза.

   Lips, teeth, cheeks, fingers and eyes.

5. Мой папа доктор, моя сестра студентка.

   My daddy is a doctor, my sister is a student.

Part C. Fill in the missing letters:

1. П_о_тол_о_к, ок_н_о и час_ы_. 2. Ка_р_тин_а_ на стен_е_. 3. Э_т_о ег_о_ м_е_л? Н_е_т, э_т_о е_ё_ м_е_л. 4. Ст_у_денток_а_ Ж_е_ня е_г_о тёт_я_. 5. Ме_х_ан_и_к, ди_р_ект_о_р и ави_а_то_ се_й_час т_а_м. 6. Эт_о_ и_х_ о_ч_ки.

THE FOLLOWING TWO PARTS WILL BE GIVEN OVER TELEVISION

Part D. Dictation:

1. Часы на стене.
2. Мел, пол и потолок.
3. Это окно или картина? Это окно.
4. Это лицо или рука? Это рука.
5. Его брат авиатор теперь.

Part E. Name each flash card in Russian:

1. Голова
2. Ухо
3. Механик
4. Картина
5. Часы
6. Зубы

APPENDIX A4

RUSSIAN LANGUAGE—ORAL TEST

A. What is your name?

The name of your school?

The name of your principal? Your grade?

B. REPEAT THE RUSSIAN ALPHABET

C. GIVE THE NAME OF EACH CARD IN RUSSIAN:

1. Book 2. Milk 3. Face 4. Tower 5. Armchair

D. TO EACH RUSSIAN QUESTION GIVE YOUR ANSWER IN RUSSIAN:

1. Где мама теперь?

2. Где работает ваш папа?

3. Миша сегодня в школе или дома?

4. Механик работает на заводе или в банке?

5. Профессор обедает в ресторане или дома?

E. HOW WOULD YOU SAY IN RUSSIAN:

1. My daddy works in the bank.

2. Your sister Jean is at school today.

3. His brother speaks Russian very well.

4. Doctor Simmons understands Spanish.

5. Where is citizen Petrov now? He is at the plant.

F. READING TEST IN RUSSIAN:

1. Же́ня понима́ет по-англи́йски о́чень хо́рошо.

2. А́нна уже́ рабо́тает на заво́де.

3. До́брое у́тро, ма́ма и па́па!

4. Ма́ша пьёт лимона́д, а Ко́ля пьёт молоко́.

5. Студе́нт ку́шает хлеб, суп и мя́со.

This concludes the oral tests at the ---------- Elem. School.

APPENDIX A5

QUESTIONS ABOUT THE RUSSIAN CLASS

1. How do you like this Russian class?
   - _____ I like it a lot.
   - _____ I like it most of the time.
   - _____ I like it sometimes.
   - _____ I don't like it very much.
   - _____ I don't like it at all.

2. Would you like this class to be shorter?
   - _____ Yes
   - _____ No

3. Would you like this class to be longer?
   - _____ Yes
   - _____ No

4. Do you wish the teacher would go slower?
   - _____ Yes
   - _____ No

5. Do you wish the teacher would go faster?
   - _____ Yes
   - _____ No

6. Is there something you would rather be doing after school instead of taking Russian?
   - _____ Yes
   - _____ No

7. What? _____

_____

_____ _____

School Name

APPENDIX A6

PUPIL INTEREST IN RUSSIAN CLASS

We would like for you as a parent to tell us how your child is responding to the Russian course he is taking after school.

A. Here is a list of statements already made by some of the parents. Check each statement that is also true of your child.

	Check here if true
1. Has wanted to quit the Russian class.	
2. Parents have told him he shouldn't be a quitter.	
3. Has been discouraged with the programs.	
4. Grumbles about the class.	
5. Hard time to settle down to it.	
6. The newness has worn off the course.	
7. Likes it sometimes, sometimes doesn't	
8. Parents wish he could spend more time at it	
9. Parents motivate him to study his Russian.	
10. Didn't like the course at first.	
11. Parents help him to study the Russian.	
12. Likes it even better now than when first began.	
13. Have not had to encourage him to stay with it.	
14. Still enthusiastic.	
15. Interest has remained high in the course.	

B. How often has the Russian course, by being after school, interferred with your child's . . . (check answer for every one)

	Always	*Often*	*Occa-sionally*	*Seldom*	*Never*
1. Chores or home duties.					
2. Transportation home from school.					
3. Church activities.					
4. Play					
5. Family visits and outings.					
6. Evening meal.					
7. Rest.					
8. Other homework.					
9. Other lessons (music, dancing, etc.)					
10. (Write in any other activity.)					

APPENDIX B

Statistical Design 1.

For maximum-entry data giving students' performance across three years, a chi square median test was used. Because these data included the scores of every available student, the sample sizes were unequal for both groups and years. This places a burden on the assumption of homogeneity of variance for the analysis of variance procedures. Therefore, the chi square tests were used. The median amount of change in score from the first year to the third year was computed across the combined students in all groups. A contingency table was then prepared showing for each group the number of students who placed above and below the median change. The total chi square for this contingency table was partitioned to show the significance of the change demonstrated for each group.

Statistical Design 2.

For matched groups with repeated measurements on the subjects within each group, a factorial-type analysis of variance was used. The columns represented time intervals for the repeated measurements. The rows consisted of the groups being compared. The multiple entries in each cell were either the same or matched students. The main effects of rows and columns, and the row-by-column interaction, were all tested by the within-cell error term, assuming this to be a fixed-constants model.

Statistical Design 3.

When repeated measurements were compared on independent (nonmatched) groups, an analysis of variance of the split-plot type was used. The column effect consisted of time periods for the repeated measurements. The row effect represented the various independent groups. The subjects within each group were, of course, the same persons across the columns and were different persons across the rows. The main effect of rows was tested by the error term found by pooling the within-variance from each group. The main effect of columns and the row-by-column interaction were tested by the residual-error term. Appropriate individual degree-of-freedom contrasts were made for isolating the results for the several groups.

Statistical Design 4.

This design is a simple analysis of variance with treatment groups across the columns and independent subjects within each group. This design gives a main effect and a within-sum squares which serves as the denominator and test for the main effect. If only two groups were compared the equivalent statistic, the t-test, was used.

Statistical Design 5.

All the correlational computation used the Pearson product-moment coefficient. When matrices of correlation coefficients were factor-analyzed, the principal components-method of factoring was used. The factors were rotated orthogonally by Kaiser's Varimax solution. When matrices of correlation coefficients were analyzed for prediction purposes, a step-wise multiple-regression routine was used. This routine was programmed for computer use by M. A. Efroymson.

APPENDIX C

The Factor Analysis Matrix for the Second Year

Variables	*I*	*II*	*III*	*IV*	*V*	*VI*
1. IQ	.46	–.58	.11	.14	–.08	–.32
2. Word knowledge	.35	–.61	.23	–.02	.03	–.32
3. Word discrimination	.46	–.44	.08	–.04	–.02	–.55
4. Reading	.19	–.73	.10	.17	.07	–.02
5. Spelling	.60	–.38	–.08	–.19	–.18	–.32
6. Language	.51	–.45	–.06	.17	.09	–.22
7. Arithmetic computation	.21	–.65	–.37	.01	–.01	.01
8. Arithmetic reasoning	.25	–.74	–.12	–.02	.04	.18
9. Difference* in Science	–.06	.23	.69	.08	–.20	–.02
10. Difference in Social Studies	–.05	–.15	.77	.02	.07	.03
11. Difference in Arithmetic	.01	–.18	.53	–.32	.21	.41
12. Difference in Spelling	.07	.07	.61	–.03	.02	–.03
13. Difference in Self-Initiated Drive	.01	–.12	–.03	–.01	.82	.14
14. Difference in Leadership	.00	–.05	.00	.14	.72	.02
15. Difference in Emotional Control	–.07	.18	.09	.02	.66	–.28
16. Difference in Pupil Self-Report	–.07	–.04	–.04	–.08	.07	–.60
17. Father's years of education	.10	–.08	.02	.86	.07	.04
18. Mother's years of education	.01	–.06	–.05	.86	.07	.04
19. Parent Rating	.60	–.09	–.11	.10	–.11	–.04
20. Russian translation	.92	–.18	.07	.09	.00	.10
21. Russian dictation	.91	–.20	–.34	.01	–.03	.07
22. Russian objective	.76	–.06	.11	.07	.01	.34
23. Russian grammar	.87	–.10	–.10	.10	–.07	.04
24. Russian reading	.81	–.11	.04	–.07	.00	–.23
25. Pronouncing Russian	.75	–.08	.01	–.12	.14	–.12
26. Russian oral understanding and grammar	.81	–.15	.08	.04	.02	.01

* This difference is between the midterm and final scores on these variables.

APPENDIX C

The Factor Analysis Matrix for the Third Year

Variables	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*	*X*	*XI*
1. IQ	.36	−.09	.26	−.12	−.62	−.13	.26	.17	−.01	−.17	.05
2. Word knowledge	.29	.09	.17	−.15	−.71	.04	.20	.02	.07	.10	−.04
3. Word discrimination	.40	.07	.20	−.24	−.66	−.14	.07	−.06	.00	.01	.06
4. Reading	.30	−.06	.18	.05	−.61	.07	.27	−.12	−.03	−.03	−.05
5. Spelling	.49	.06	−.01	.00	−.49	−.18	−.10	−.02	.04	−.17	.08
6. Language	.47	−.01	−.05	.20	−.51	.09	.24	.00	.07	.00	−.01
7. Arithmetic computation	.43	−.15	−.07	.11	−.33	−.11	−.04	.07	−.30	−.46	.04
8. Arithmetic reasoning	.43	−.17	.08	.04	−.49	−.15	.01	.07	−.18	−.38	.07
9. Difference* in Science	−.06	−.04	.07	−.18	.02	−.58	.11	.24	−.40	−.14	−.11
10. Difference in Social Studies	−.10	.05	−.22	.04	−.17	−.73	.11	−.19	.25	.13	.19
11. Difference in Arithmetic	.01	.03	−.04	.12	.03	−.01	.01	.09	.76	−.07	.00
12. Difference in Spelling	.03	.11	.00	−.21	.09	−.62	.04	.04	−.28	.03	−.39
13. Difference in Russian dictation	−.04	.17	−.19	.26	.15	−.06	.01	−.05	−.58	−.16	−.01
14. Difference in Russian translation	−.12	.67	−.03	−.07	−.16	−.17	−.15	−.01	−.28	−.19	−.01
15. Difference in Russian completion	.17	.08	.36	.04	−.18	.05	.23	.58	−.15	.27	.39
16. Difference in Russian comprehension	.09	.28	−.26	−.04	.15	.04	.00	.12	.39	−.49	−.01
17. Difference in Russian total	.07	.57	.03	.08	−.05	−.02	.13	.51	−.43	−.02	.36
18. Difference in Self-Initiated Drive	.03	−.05	.00	.81	.01	.09	.04	.04	.10	.08	.02
19. Difference in Leadership	−.11	.06	.09	.78	−.05	−.06	.00	.04	.12	.04	−.03
20. Difference in Emotional Control	.09	.00	−.05	.74	.04	.00	.01	−.13	−.11	−.14	.00
21. Difference in Pupil Self-Report	.02	.01	−.07	−.08	.01	−.01	.00	.83	.20	−.04	−.01
22. Science	.01	.02	.53	.04	−.06	.01	.09	−.05	.29	−.59	−.07
23. Social Studies	.26	−.01	.67	.09	−.08	.12	.02	.05	.11	−.48	−.18
24. Arithmetic	.09	.02	.44	−.02	−.01	−.06	.05	.01	−.02	−.79	.02
25. Spelling	.18	−.03	.51	−.07	−.13	.16	−.03	.20	−.07	−.58	.13
26. Russian dictation	.88	−.04	.06	−.02	−.28	.00	−.06	.12	.06	.09	.04
27. Russian translation	.93	.02	.08	−.02	−.19	.05	−.01	.00	.05	−.05	.00
28. Russian completion	.79	.02	.01	.19	−.06	.06	.02	−.01	−.04	−.34	−.06
29. Russian comprehension	.89	.01	.09	−.07	−.02	.11	−.03	−.11	.07	−.03	.01
30. Russian total	.96	.00	.04	.02	−.19	.05	−.03	.03	.06	−.08	.00
31. Self-Initiated Drive	.00	.01	.91	.11	−.02	.01	−.03	−.06	.00	−.21	.03
32. Leadership	−.05	−.04	.80	−.16	−.10	−.16	−.12	−.13	.03	−.05	.09
33. Emotional control	.10	.02	.86	.07	.00	.18	−.04	.08	−.09	.09	−.06
34. Pupil Self-Report	.36	.24	.08	−.30	−.09	−.09	.27	−.29	.05	−.21	.18
35. Parent Rating	.32	.13	.22	−.27	−.06	−.14	.02	−.45	.29	−.13	.34
36. Father's education	−.06	.02	−.07	.20	−.09	−.04	.83	.04	.01	−.02	.02
37. Mother's education	.00	−.03	−.12	−.05	−.10	−.05	.84	−.01	−.01	−.03	−.01

* This difference is between the midterm and final scores on these variables.

APPENDIX D

Intercorrelation Matrix of Multiple-R Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. IQ																	
2. Word knowledge	.59																
3. Word discrimination	.65	.61															
4. Reading	.57	.50	.48														
5. Spelling	.48	.40	.54	.25													
6. Language	.47	.49	.44	.43	.47												
7. Arithmetic computation	.46	.26	.41	.38	.31	.32											
8. Arithmetic reasoning	.58	.44	.37	.45	.43	.35	.66										
9. Pupil Self-Report	.26	.23	.24	.15	.22	.27	.10	.19									
10. Parent Rating	.39	.29	.42	.25	.34	.25	.24	.27	.71								
11. Father's education	.20	.06	.06	.14	.03	.21	.02	.06	.08	-.01							
12. Mother's education	.22	.21	.19	.22	-.03	.15	.09	.06	.19	.06	.54						
13. Science	.43	.25	.37	.43	.29	.23	.25	.35	.26	.37	.09	-.03					
14. Social Studies	.30	.27	.23	.29	.24	.24	.16	.19	.46	.34	.18	.18	.50				
15. Arithmetic	.30	.06	.18	.34	.17	.16	.32	.32	.25	.25	-.03	-.09	.62	.40			
16. Spelling	.17	.03	.13	.17	.17	.10	.05	.12	.18	.09	-.04	-.09	.43	.25	.43		
17. Russian total (criterion)	.40	.32	.43	.28	.44	.44	.31	.34	.50	.41	.19	.20	.31	.39	.33	.24	

Ordered Predictors and the Resulting Multiple Correlations

Predictor	*Cumulative R**
1. Pupil Self-Report	.497
2. Spelling (MAT†)	.603
3. Language (MAT)	.631
4. Arithmetic (classroom)	.652
5. Mother's education	.664
6. Word discrimination (MAT)	.671
7. Father's education	.676
8. Spelling (classroom)	.678
9. Arithmetic computation (MAT)	.682
10. Reading (MAT)	.685
11. Social Studies (classroom)	.686
12. Science (classroom)	.688
13. IQ	.688
14. Arithmetic reasoning (MAT)	.689
15. Parent Rating	.689
16. Word knowledge (MAT)	.689

* The variables are ordered according to their ability to predict Russian achievement beginning with the best single predictor, Pupil Self-report. As each variable is added in turn the cumulative multiple correlation of Russian achievement with the combination of that variable and those preceding it is given at the right.

† Metropolitan Achievement Test.